

1



2



3



4

1. Calcium acid lactate obtained from a solution of calcium phosphate in pure lactic acid.
2. Crystals from a solution of calcium phosphate in acetic acid.
3. Calcium acid lactate from calcium phosphate in pure lactic acid, same as 1.
4. Crystals from a solution of calcium phosphate in ordinary lactic acid.

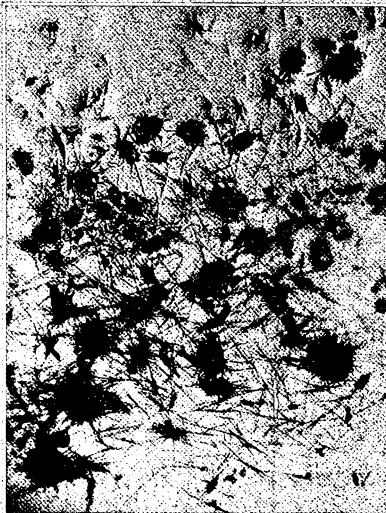
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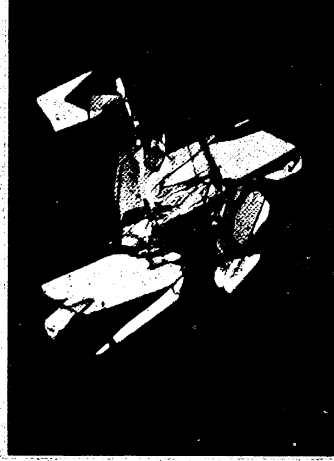


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5. Same crystals as 4, with different light.
6. Crystals from a solution of calcium phosphate in acetic acid.
7. Crystals of calcium lactate.
8. Crystals from a solution of calcium phosphate in lactic acid—
formed slowly.



9



10



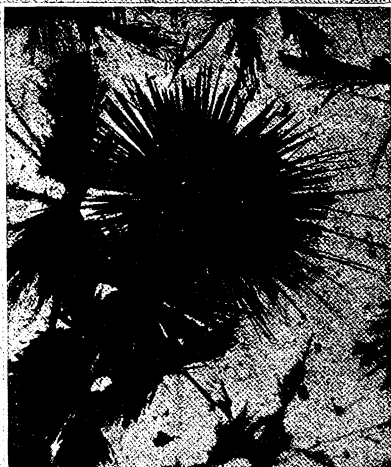
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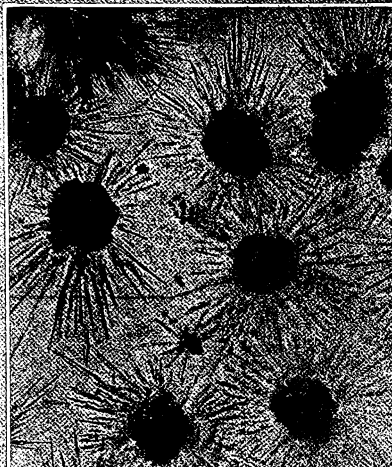
12

9. Crystals of *so-called* calcium lacto-phosphate.
 10. Crystals formed slowly in a solution of calcium phosphate in lactic acid.
 11. Direct light photo of *so-called* calcium lacto-phosphate from No. 1.
 12. Polarized light photo of *so-called* calcium lacto-phosphate from No. 1.

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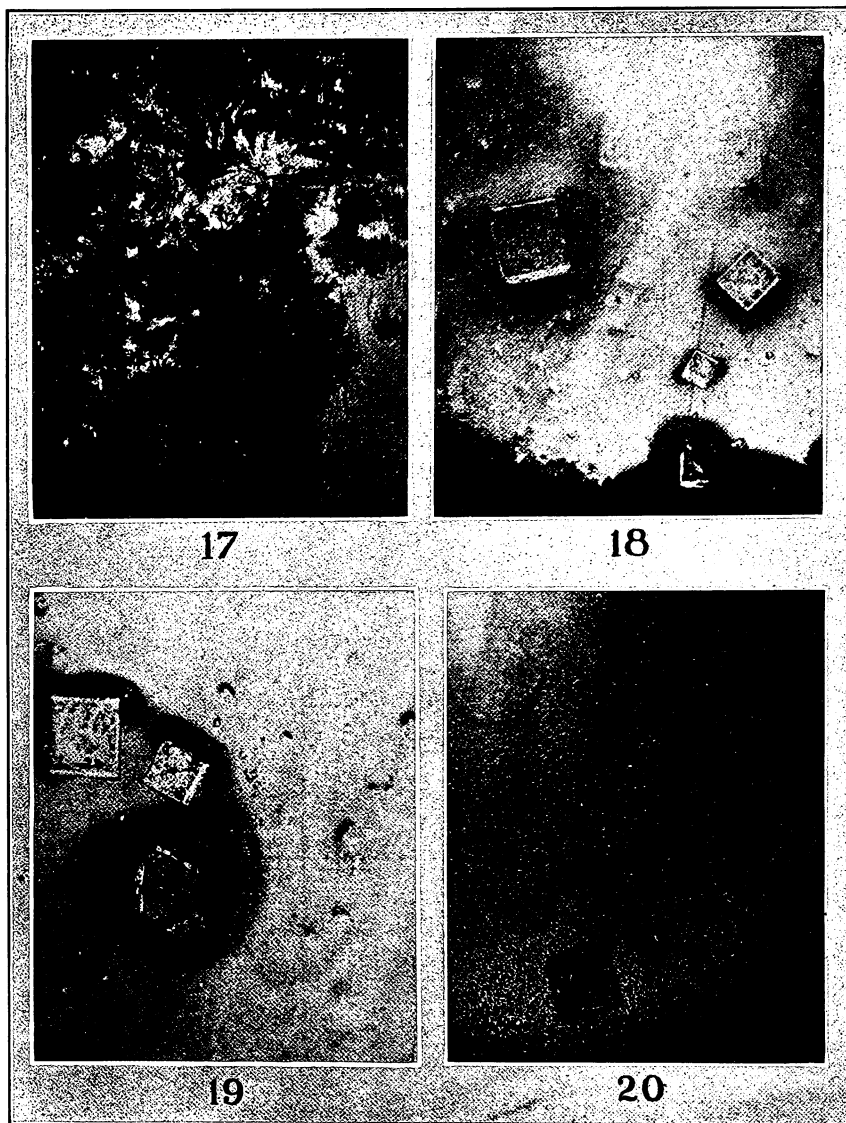


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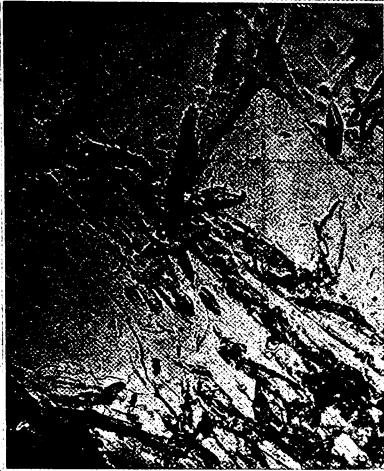
16

13. Direct light photo of same crystal as No. 12.
14. Crystals of calcium lactate like Boston's tyrosin crystals, one form.
15. Crystals from a solution of calcium phosphate in propionic acid.
16. Crystals of calcium propionate—dilute solution.



17. Crystals of calcium proportionate—concentrated solution.
18. Crystals from Hinkins' dialyzed saliva (obtained by chewing gum) after two days' growth.
19. Same as No. 18, containing crystals with a hexagonal form.
20. Crystals from Hinkins' dialyzed saliva—no gum chewed.

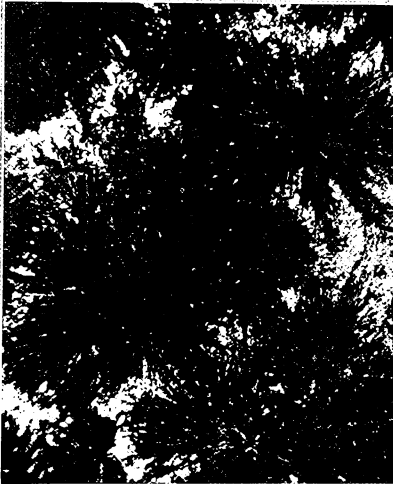
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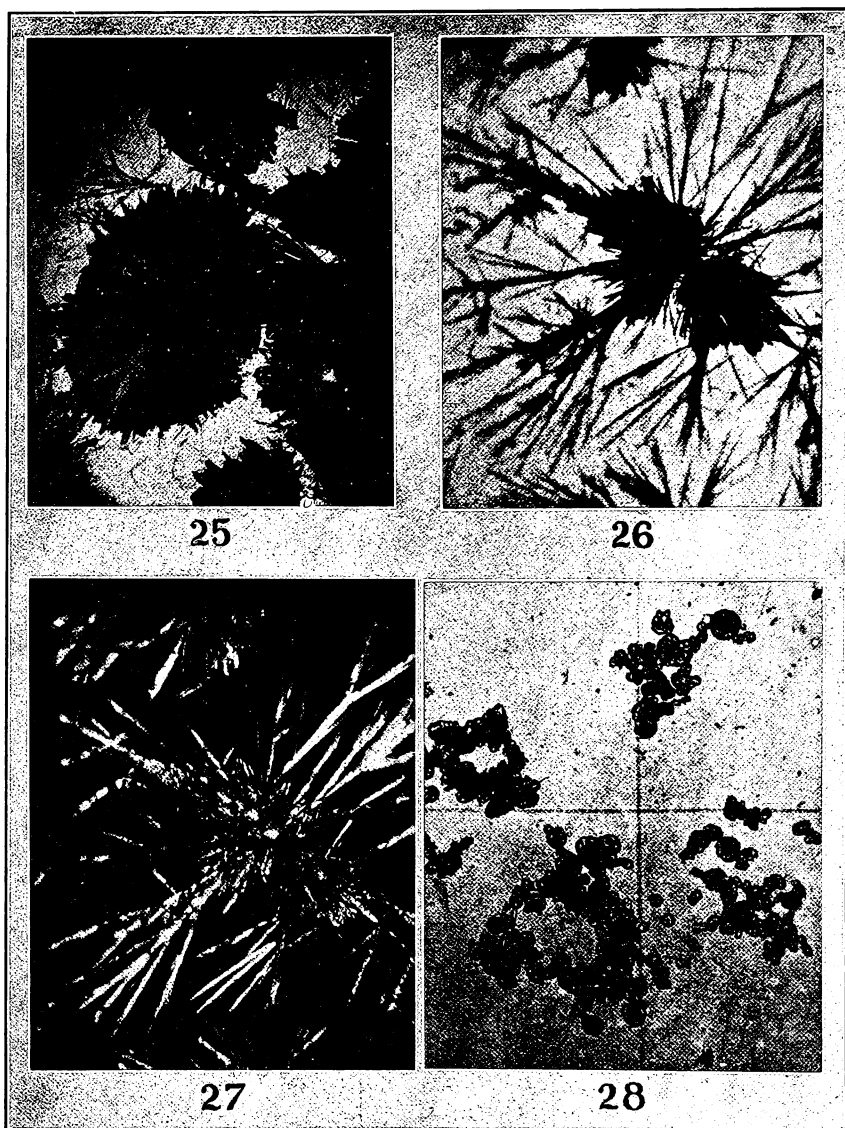


23



24

21. Crystals from a solution of calcium phosphate in propionic acid.
22. Same slide as in No. 21.
23. Crystals from a solution obtained by allowing a tooth to remain in 100 c.c. of 1 per cent. lactic acid for one week—not dialyzed.
24. Calcium acid lactate from calcium lactate and lactic acid—small crystals.

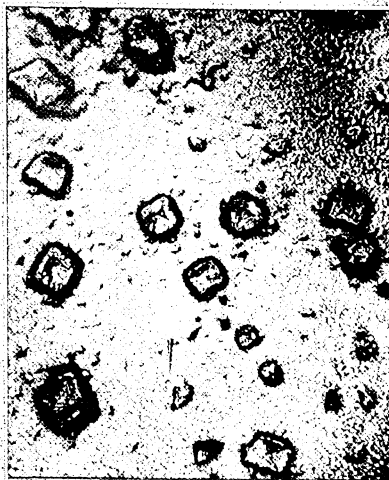


25. Same as No. 24, large crystals.
26. Single crystal of calcium acid lactate in ordinary arc light.
27. Same crystal as No. 4 in polarized light.
28. Crystals from a solution made by treating a tooth in 100 c.c. 1 per cent. lactic acid and evaporating to a syrup.

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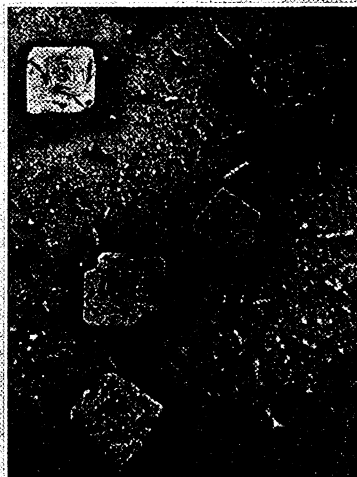
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31



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29. }
 30. } Hinkins' saliva, dialyzed; crystals grown two weeks, showing both
 31. } crystal forms.
 32. }



33



34



35

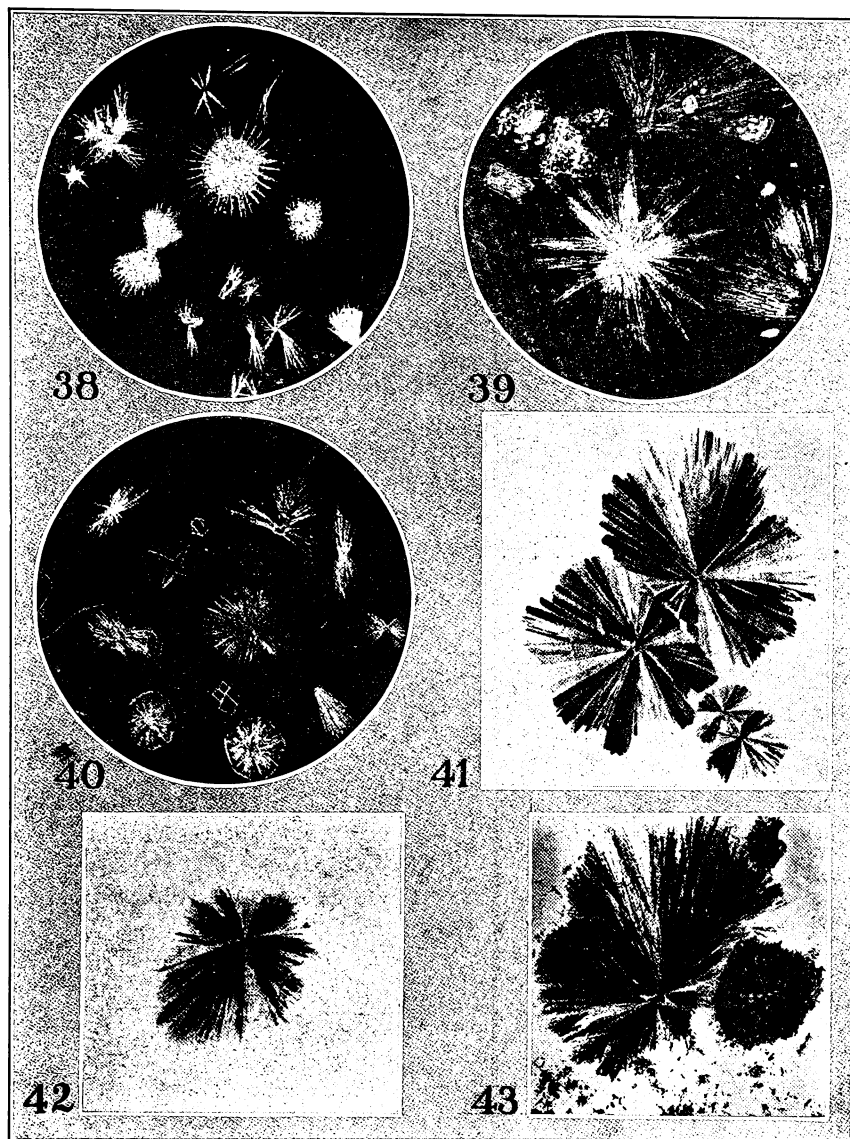


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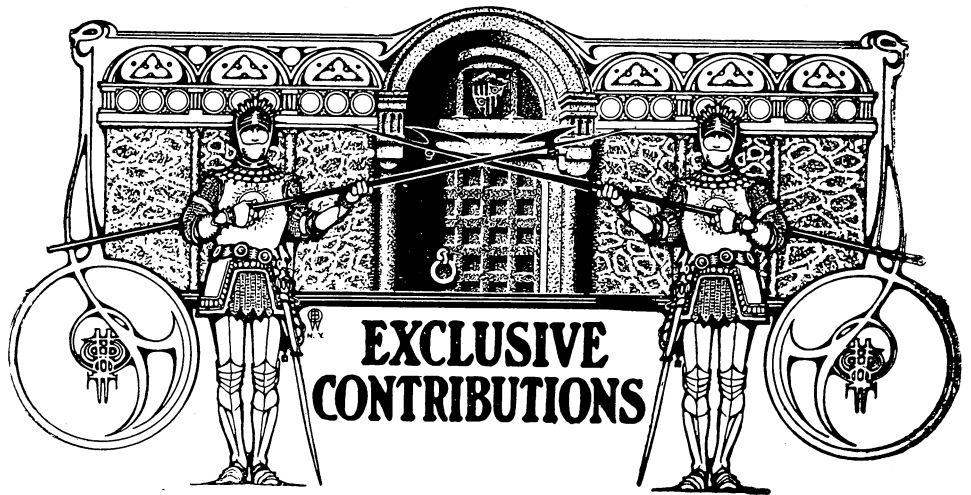


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33. Round crystals of zinc lactate.
34. Sheaf-like crystals of zinc lactate, by ordinary light.
35. Sheaf-like crystals of zinc lactate, by polarized light.
36. Sheaf-like crystals of zinc lactate, by ordinary light.
37. Field of zinc lactate, by ordinary light.



38. Tyrosin crystal, taken from Boston. 39. Crystals of calcium phosphate, taken from Boston. 40. Leucin and tyrosin crystals, taken from Boston. 41. Magnesium lacto-phosphate, made by action of lactic acid on pure magnesium phosphate. Fig. 9, Kirk's. 42. Calcium lactate, made by action of lactic acid upon pure calcium carbonate. Fig. 6, from Kirk's. 43. Crystallization of salts from dialysate of saliva from erosion case, showing two typical forms. Fig. 3, from Kirk's.



Some Investigations on General and Local Erosion of the Teeth.

By J. E. HINKINS, D.D.S., Chicago.

In an article appearing in *ITEMS OF INTEREST*, July, 1902, Dr. E. C. Kirk published a paper under the title of "*The Clinical and Chemical Study of a Case of Dental Erosion.*" In this paper Dr. Kirk reported on a case of general erosion that had come under his care, and stated that as a result of his investigations on this one case (p. 518) "*the determination of the solvent in this case and the general nature of the disorder, affecting as it does all the teeth, would seem to make it necessary to divide our erosion cases into two classes—those in which the erosion is general in which all of the surfaces of the teeth are uniformly involved, in which lactic acid is the solvent acid; and the other class, which is distinctly due to the exudate from an abnormal buccal mucous gland or glands, the acidity of which is due to one of two things—the acid sodium phosphate or the acid calcium phosphate. I have pursued the study of this case only to the point of determining the presence of lactic acid as the active solvent agent. My study of other cases has gone far enough to warrant me in expressing the belief that the localized cases are produced by the abnormal mucous exudate containing either of the two solvents named.*"

After a careful perusal of Dr. Kirk's article and his method of work, especially his chemical methods, involving the detection of the lactic

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acid, the sodium acid phosphate, and the calcium acid phosphate, I am enabled to point out some of the errors in Dr. Kirk's chemical technique and in his conclusions regarding the causes of local and general erosion.

In my paper read before the Fourth International Dental Congress at St. Louis, August 31, 1904, dealing with the question of erosion in general, I pointed out that in all the cases which I studied, the salivas of those individuals suffering from erosion were acid, indicating the possible activity of the enzymes in the body in the formation of these acids contained in the saliva (vide *Dental Cosmos*, March, 1905, p. 328). I said in that paper: "*In a paper by Dr. E. C. Kirk (Items of Interest, July, 1902), the theory is discussed that erosions may be due to the action of lactic acid and the acid phosphates of sodium and calcium upon the tooth structure. We wish to point out that in our paper, read in Paris in 1900, we pointed out the role played by these organic acids in the failure of cements and tooth structure—and in view of this Dr. Kirk's hypothesis is not new. Dr. Kirk dialyzed saliva and obtained crystals from this liquid which he thought to be lactates or lacto-phosphates. We do not feel that reliable conclusions can be drawn from such data. There are many thousand different substances with the same crystal form. Unless these crystals are isolated and subjected to a chemical analysis—which Dr. Kirk apparently did not make—one can draw no conclusions in regard to their chemical composition. Aside from this it has been known for some time that calcium acid phosphate is a normal constituent of the saliva, and that lactic acid is formed by bacterial agencies in the mouth. The presence of these lacto-phosphates does not prove that they arise from tooth erosion.*"

In an editorial which appeared in the *Dental Cosmos*, March, 1905, Dr. Kirk replied to my criticisms. Dr. Kirk's article tends to make it appear that I have made statements and hold views different from those which I really have. I will therefore point out some of the errors in Dr. Kirk's reply. In the first one-third of the editorial in the *Dental Cosmos*, 1905, pp. 338-339, he fails to give me credit for my researches showing the role of the organic acids formed by mouth bacteria in the solution of cement fillings and decay of tooth structures, and gives all this credit to Dr. Miller.

Now then let us quote Dr. Kirk in the *Dental Cosmos*, p. 338: "*I take it for granted that the facts which Dr. Hinkins's reesarches tended to prove are generally accepted by all who have given any attention to the questions, especially as this general fact was also clearly demonstrated by the researches of Miller nearly twenty-five years ago in his study of dental caries.*"

"The fact that acids are produced by fermentative processes 'in the mouth' has come to be part of the common knowledge of dentistry; so likewise was the fact that it was the research of Miller which established it. . . . Miller's researches clearly demonstrated the fact that acids formed at the seat of decay do actually dissolve the calcium phosphate of the tooth structure, this process constituting one of the essential factors in dental caries."

**Prof. Miller's
Investigations
Discussed.**

Let us now see what Dr. Miller has to say about this work that Dr. Kirk gives him credit for. Concerning Miller's *Mikroorganismen der Mundhole*, German Edition, 1892, p. 104, (only thirteen years ago), he says in the chapter on Mouth Bacteria as causes of fermentation on page 104: "*The spontaneous formation of butyric acid by fermentation has not been observed in the mouth.*" On page 110 under the heading *Fermentation of fat and fat acids in the mouth*, he says: "*Whether or under what conditions the fermentation of fats or fatty acids, etc., spoken of on page 30, occur in the mouth, on this there are no data.*" Page 111: "*Whether the various fermentations mentioned on page 28, in which lactic, butyric, propionic acids, etc., are formed, occur in the mouth in any considerable amount, is unknown; on this no experiments have been carried out.*"

Now let us ask Dr. Kirk if any of this reads as though Dr. Miller's researches showed twenty-five years ago that acids are produced by fermentative processes in the human mouth?

Dr. Miller really showed that certain mouth bacteria generate acids in media *outside the mouth*. I showed in my paper, read before the International Dental Congress in Paris, just how strong these acid solutions may become, and that they are strong enough to dissolve cement fillings readily, and that since calcium phosphate has about the same solubilities, it should be dissolved by these acids, which we have since amply verified by experiment.

Now, in regard to the second point above quoted from Dr. Kirk: Dr. Kirk says that Dr. Miller showed *that acids formed at the seat of decay do actually dissolve the calcium phosphate of the tooth structure*. Now let us turn to Dr. Miller's paper and see what Dr. Miller says about what he showed. In the *Independent Practitioner*, December, 1883, Vol. IV, page 637, and also in Miller's book, page 150, he describes the analysis of carious teeth and sound teeth, and finds that there has been a loss of calcium phosphate in the carious portion. But this by no means proves that the acids or the acids alone were the solvent; there are other products of fermentation present, such as ptomaines, organic nitrogenous bases from the proteid contents of the tooth, etc., and the possibility of

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solution by these was not excluded. There are other things besides acids that dissolve calcium phosphate; namely, bases and salts. And especially must we remember that Young and Hurst have shown that *neutral salts*, like the chlorides and nitrates of potassium and sodium, which occur in all salivas, dissolve calcium phosphate with the simultaneous formation of acid. Did Dr. Miller's experiments then prove that the bacteria generated the acids in the mouth and that these then dissolved the teeth, or did his experiments prove, for example, that bacteria are able to draw potassium chloride around them in unusually large quantity and that this potassium chloride dissolved the tooth, at the same time giving rise to an acid? I submit that Dr. Miller's experiments did not decide between these two possibilities. Furthermore, in discussing the purely chemical theory of caries, on pages 119, 120, 121, Miller refers to about fifteen individuals before his time who held the chemical theory as the correct one. Miller does not at any time claim credit for this hypothesis. But Miller himself, in discussing this theory at the end of the chapter, says (page 121): "*The untenability of the purely chemical theory of tooth caries has been shown so many times from various sides in recent years, that it does not seem necessary to go into this fully at this point.*"

Dr. Miller did not mention in his article that he took the pure organic acids, free from bacteria, and treated teeth or cements with them to test their solubility. Furthermore, let us see what Dr. Miller said in St. Louis in discussing my paper on erosion. On page 335, *Dental Cosmos*, March, 1905, Dr. Miller says in his discussion: "*I have hesitated to accept the acid theory, because authorities differ. We have such men as Preiswerk, Dill and others who are in authority among us and they claim that erosion is most frequent when the saliva has an alkaline reaction. If erosion is caused by acids, I can not understand how it is that we have the bright, shining surface. You can not produce a shining surface by the action of acids on tooth substance. If you act upon enamel by an acid and brush it with a brush, the surface on drying will appear chalky. For this reason I have not quite been able to accept the theory of acid having a prominent part in the production of erosion.*"

From all the above statements it is quite clear that Dr. Miller does not acknowledge as much credit for the subjects under discussion as Dr. Kirk honors him with.

Dr. Kirk's Investigations Discussed.

And now let us take up Dr. Kirk's discussion of my criticism of the methods of analysis employed by him in the determination of the presence of lactic acid in the saliva of his patient by means of his so-called *calcium lacto-phosphate*. It will be recalled that Dr. Kirk dialyzed the saliva of his patient, evaporated the dialyzed

portion and allowed some of this to crystallize on slides. He thus obtained crystals having a sheaf-like form, and which in this form rotated polarized light, and which he *thought* to be calcium lacto-phosphate—but not once did he give any evidence of having analyzed them by chemical means. He did, however, dissolve some calcium phosphate in lactic acid, and evaporate this, and he got crystals again which had the same sheaf-like form, which rotated polarized light and which he also took for granted to be *calcium lacto-phosphate*—but again he made no analysis of this substance, which could very easily have been done, as he could obtain it by this means in large quantities. Dr. Kirk dissolved magnesium phosphate in lactic acid, and by similar methods obtained crystals which he called *magnesium lacto-phosphate*—but for which he gave no analysis.

I object to the methods used by Dr. Kirk on two grounds: First, he did not analyze by chemical means either the saliva or the crystals which he obtained and which he could readily have done, as lactic acid is a substance very easily detected; second, his only means of identifying the crystals obtained from the dialyzed saliva was to compare them with crystals made from a solution of calcium phosphate in lactic acid. The two sets of crystals *looked alike*—and he called them *calcium lacto-phosphate*.

Since we have nearly 100,000 organic and inorganic chemical compounds tabulated, and since there are comparatively few crystal forms known, it follows as a necessary consequence that there may be many hundred compounds having the same crystal form and the power to rotate polarized light when in the crystal state. This fact alone, then, makes all careful chemists analyze by chemical means the compounds with which they work. Although it is true that probably a very much smaller number of these compounds occur in the saliva, yet even if there were only *two*, we should still analyze the crystals to determine what they are. As my photographs will show, and as has been well-known for nearly one hundred years, the appearance of the crystal forms of a substance under the microscope varies with the length of time of their growth, with the nature of the solvent from which they precipitate out, and very often with the nature of the substances dissolved along with them.

On page 339, *Dental Cosmos*, March, 1905, Dr. Kirk says: "*The method by which the identification of the several crystals, as referred to, was made, in the opinion of those who being expert chemists are men competent to pass judgment thereon, is of at least equal accuracy with the modes of ordinary chemical analysis. There are other methods than by chemical analysis to determine the identity of various chemical substances.*"

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The above statement does not conform to the facts. A glance at the contributions from the chemical laboratories of the University of Pennsylvania, Johns Hopkins University, Harvard, University of Chicago, Yale, Columbia, or any other reputable university in this or other countries, whether these contributions come from the faculties or from the candidates for the degree of Doctor of Philosophy, will show that the compounds are analyzed by chemical means, even when they have been characterized before. Such things as the crystal form, the melting points, the solubilities in various solvents, etc., are *aids* in determining the identity of the compounds in question; but by no *one* alone nor by all of these can we be absolutely certain of the composition or constitution of a compound until we have analyzed it and subjected it to various chemical reactions to determine the grouping of the atoms within the molecule. Nicotine, for instance, was discovered in 1843, but it was only in 1903, after all those years of work by Willstatter, Buchner and Pictet, that its constitution was finally solved and the substance was actually synthesized in the chemical laboratory.

And how misleading is Dr. Kirk's comparison of the relative value of the micro-polariscope and of the spectroscope in determining the identity of a substance! When substances are volatilized in a Bunsen flame or in an arc light, or in a Bessemer converter and viewed through a spectroscope, each element gives certain definite lines having certain definite positions in the spectrum, and the spectrum of each element is not influenced by the spectra of others. One has only to note the position of the lines and compare them with a map of the lines of all known elements to learn just what elements are giving the spectra. And this is just as exact as a chemical analysis by other means would be. But who would dare to say that small cubical crystals under a micro-polariscope are sodium chloride, or potassium bromide, or slightly impure ammonium chloride, or one of a hundred other things?

Calcium Lacto-phosphate and Erosion.

And now let us take up the study of Dr. Kirk's so-called *calcium lacto-phosphate*, and see if there is any connection between this and general erosion, as claimed by Dr. Kirk.

First, we have his general proposition that *general erosion* is caused by excessive lactic acid formation by *fermentation* in the mouth, and that in such cases the so-called calcium lacto-phosphate will be found in the dialyzed saliva. It has already been reported by Drs. Cook and Buckley, and myself, that we examined a number of cases of general erosion accompanied by acid saliva (see the *Dental Review*, April 15, 1905), in order to learn whether this suggestion of Dr. Kirk's would be of any assistance to us in determining the cause of the

erosions. In every case examined, the crystals obtained from the dialyzed acid saliva were entirely different from those described by Dr. Kirk, and different from the sheaf-like forms which are obtained by treating calcium phosphate with lactic acid and allowing this solution to evaporate on slides, and which were, of course, the *so-called* calcium lacto phosphate. So here were several cases of general erosion in which the dialyzed acid saliva did not give the *so-called* lacto-phosphate crystals; in other words, we had here several cases of general erosion, not traceable to lactic acid, while Dr. Kirk had *one*, which he thinks to be due to lactic acid. Such a disparity in the number of cases of erosion due to lactic acid and those not due to lactic acid would not speak strongly for Dr. Kirk's theory of general erosion.

But we can go further in this line. We have examined a number (six) of cases of erosion accompanied by acid saliva and have tested for the lactic acid by *chemical means*. Ewald's test is so delicate that when 1 c. c. of 1 per cent. ferric chloride and 1 c. c. of 1 per cent. carbolic acid is added to a solution containing one-sixteen-hundredth of 1 per cent. lactic acid the violet color is changed to yellow. Out of six cases examined, only one gave even an indication of lactic acid. Yet the amount of acid present in all these cases, as determined by titration, far exceeded the amount of lactic acid necessary to change the colors indicated above. So it is quite evident that we have many more cases of general erosion accompanied by acid saliva not containing lactic acid than cases actually containing lactic acid. Thus Dr. Kirk's theory that general erosion is due to lactic acid is contradicted also by this accurate chemical evidence.

But now let us examine the *so-called* calcium lacto-phosphate spoken of so often by Dr. Kirk. Dr. Kirk did not analyze this substance, or substances if it is a mixture, although it could have been obtained in large quantities very easily by his method. Is it really *calcium lacto-phosphate*? Does it really contain, as *essential constituents*, calcium, lactate and phosphate radicals? If a dentist, on examining an unknown saliva, were to find these sheaf-like crystals, and had too little to analyze by chemical means, could he be sure that the patient was suffering from erosion of the teeth by lactic acid? In other words, could he be sure that the teeth were being eroded at all or that there was lactic acid in the saliva?

All these questions we must answer in the negative. The *so-called calcium lacto-phosphate* is nothing but calcium acid lactate. Our analysis of the substance, the quantitative titration of the amount of lactic acid not combined with the calcium, its formation by other methods which give the same substance with the same crystal form, solubilities and optical properties—all these show beyond question that the substance is calcium acid lactate mixed with a small amount of calcium phosphate.

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There is no phosphate radical in these sheaf-like crystals. So if the sheaf-like forms were found in a saliva, one would not be warranted in assuming that erosion was present in that mouth; for there is calcium bicarbonate in the saliva (Hammerstein, 1904, p. 290), and lactic acid formed by fermentation would act upon this and give calcium lactate or acid lactate.

Furthermore, when calcium phosphate is dissolved in formic, acetic, hydrochloric, propionic or butyric acids and allowed to crystallize from these, sheaf-like crystals very similar to those of calcium acid lactate are often obtained, which show the same optical properties. So it is evident that cases of erosion by acetic, formic, propionic or butyric acids, all of which might be formed by fermentation and could dissolve the tooth substance, can not be differentiated from Dr. Kirk's case of lactic acid erosion by the sheaf-like crystals. In other words, as stated at the beginning of this paper, there are too many substances which look alike in crystal form for us to be able to decide what they are chemically by means of a microscope. In the accompanying photographs there are given many examples of crystals that show the sheaf-like form; such as calcium phosphate, zinc lactate, zinc acid lactate, calcium acid lactate, etc. These forms, when modified by varying conditions of the solution, etc., resemble each other too much to tell by the micro-polariscope whether or not they are identical.

Then, there is another phase of the matter. As stated at the beginning, each substance may look different under the microscope, dependent upon the time of crystallization, the concentration of the solution, the impurities in the solution, etc. Let us consider the case of calcium lactate. Here (1) is a case where the calcium lactate has a sheaf-like form. Again in (3) we have the same substance occurring in fine needles. Then, again (2) (4) here is calcium lactate with the heavy center and radiating needles that looks exactly like the round forms of tyrosin crystals taken from Boston. I submit, then, that when we have the same substance in pure state showing such different forms under the micro-polariscope, it is impossible to know that the substance may be this or may not be that. Who could say with certainty by merely looking at these round crystals of calcium lactate, without a chemical analysis, that they are not identical with Boston's tyrosin crystals? I venture to assert, that no reputable chemist would do so.

Calcium Acid Lactate.

Let us now turn to the study of the calcium acid lactate—the *so-called calcium lacto-phosphate*. From the beginning we were in doubt that this substance is really a lacto-phosphate. Although not impossible, yet our knowledge of chemical compounds made it seem very improbable

that such a compound would be formed under the conditions described by Dr. Kirk. Then there were other points to be solved which Dr. Kirk apparently did not think of. In the lactic acid fermentation there is formed not only lactic acid, but also formic, acetic, propionic (we recently discovered this), and butyric acids in appreciable amounts, varying with the time of the fermentation. Furthermore, the concentrated lactic acid (sp. gr. 1.21) used in our laboratories is made by fermentation, and contains the acids mentioned above, as I have verified. So it is apparent, that in order to study the chemistry of this compound it was necessary not only to treat calcium phosphate with ordinary lactic acid, containing the above-named acids, but also to treat the calcium phosphate with pure acetic, formic, propionic, butyric and chemically pure lactic acids and to study the crystals obtained from these solutions. Then, too, we studied the crystal forms of calcium acetate, calcium propionate, calcium butyrate, calcium lactate, and some of the acid salts of these, especially the calcium acid lactate.

The pure formic, acetic, propionic, and butyric acids are easily obtained in the market, but the *chemically pure lactic acid*, optically inactive and free from these other acids, is not listed even by Kahlbaum, the firm which makes a specialty of furnishing pure organic chemicals for scientific research. So we had to make the pure lactic acid as follows: When pure zinc lactate is dissolved in distilled water and hydrogen sulphide is passed into the solution, the zinc is precipitated as insoluble zinc sulphide and can be filtered off; the clear filtrate then contains the lactic acid formed and some hydrogen sulphide. When this solution is boiled, the hydrogen sulphide is expelled, and we have a water solution of pure lactic acid, free from the other organic acids, such as formic, acetic, etc. This water solution can be used directly for dissolving the calcium phosphate or can be concentrated on a water bath.

But we had no pure zinc lactate; so we had to make that from the impure lactic acid of commerce by neutralizing it with zinc oxide. The zinc lactate is very insoluble in cold water, but readily soluble in hot water; so it can be readily freed from the other zinc salts (formiates, acetates, etc.) by crystallization from water. So the first thing to do was to make a quantity of pure zinc lactate, and that was done as follows: . . . The lactic acid, 70 grams of 1.21 sp. gr. acid made by Kahlbaum, was digested in a flask with 60 grams of zinc oxide and 50 c.c. of distilled water some hours. The liquid was filtered off and allowed to cool and crystals of zinc lactate was obtained. The residue in the flask was digested with water again for some time, filtered and cooled and again a crop of crystals of pure zinc lactate was then obtained (A). The residue in the flask was then extracted with water in a Soxhlet extraction

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apparatus, and a second lot of zinc lactate crystallized out of the boiling solution; when this was cooled, and filtered, and the zinc lactate was dried, 45 grams of very pure salt (B) was obtained. In a similar way a third crop of 25 grams (C), and a fourth crop (D) of 10 grams, in all nearly 85 grams of pure zinc lactate. This was free from the zinc salts of the other acids, as these zinc salts are very soluble in water. Furthermore, the analysis of the various samples show them all to be pure zinc lactate.

Sample "A" 0.3006 gm. gave at 110° 0.0536 gm. H₂O and by ignition gave 0.0827 gm. zinc oxide.

| | | |
|---------------------------------------------------------|-----------------------------|-------|
| Zn. (C ₆ H ₁₀ O ₆) .3 | H ₂ O calculated | found |
| | H ₂ O, 18.17 | 17.83 |
| | Zn. O, 27.36 | 27.51 |

Sample "B" 0.3007 gm. gave at 110° 0.0545 gm. H₂O and by ignition gave 0.0832 gm. Zn. O.

| | | |
|------------------------------------------------------|-----------------------------|-------|
| Zn. C ₆ H ₁₀ O ₆ .3 | H ₂ O calculated | found |
| | H ₂ O, 18.17 | 18.13 |
| | Zn. O, 27.36 | 27.67 |

Sample "C" 0.3000 gm. gave at 110° 0.0546 gm. H₂O and by ignition gave 0.0830 gm. Zn. O.

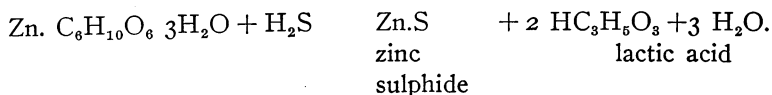
| | | |
|------------------------------------------------------|-----------------------------|-------|
| Zn. C ₆ H ₁₀ O ₆ .3 | H ₂ O calculated | found |
| | H ₂ O, 18.17 | 18.20 |
| | Zn. O, 27.36 | 27.67 |

Sample "D" 0.3000 gm. gave at 110° 0.0544 gm. H₂O and by ignition gave 0.0834 gm. Zn. O.

| | | |
|------------------------------------------------------|-----------------------------|-------|
| Zn. C ₆ H ₁₀ O ₆ .3 | H ₂ O calculated | found |
| | H ₂ O, 18.17 | 18.13 |
| | Zn. O, 27.36 | 27.80 |

The above analyses shows that all of the samples of zinc lactate were pure.

Five grams of sample "B" were dissolved in 100 c.c. of hot water and hydrogen sulphide was passed into the solution until all the white zinc sulphide was precipitated out, the reaction taking place as follows:



After the solution was allowed to stand for some time the zinc sulphide was filtered off, and the filtrate was boiled some time to drive off the hydrogen sulphide and to concentrate the solution, which was after-

ward concentrated to a low volume on a water bath. This gave us then a solution of lactic acid which had been freed from all the formic, acetic, butyric acids, etc., present in the impure lactic acid.

In order to obtain the *so-called* calcium lacto-phosphate from this pure lactic acid, we proceeded as follows: 1.5 grams of Kahlbaum's best tricalcium phosphate was warmed gently with the above lot of purified lactic acid in 25 c.c. water for some hours. It was then filtered from the undissolved calcium phosphate and divided into two equal parts (a) and (b). One part (a) was boiled and a precipitate of calcium phosphate was formed. This is a phenomenon which Dr. Kirk does not mention at all.

**Test of
Calcium Phosphate.**

That this substance is calcium phosphate was proved as follows: By dissolving some in nitric acid, adding silver nitrate to this, and then adding ammonia gradually, when the solution became neutral a heavy yellow precipitate of silver phosphate was formed. When some calcium phosphate was treated with concentrated hydrochloric acid, it gave the dull red flame-test characteristic of calcium salts. That there was no organic matter—no lactic acid or lactate—contained in this precipitate was proved as follows: Some of the substance was mixed with finely divided copper oxide and heated in a curved tube, one end of which was closed and the other end dipping into clear lime water. No turbidity showing the presence of carbon dioxide was formed, nor was the copper oxide reduced to copper in the slightest degree. Yet a small amount of triphenyl-guanidine equal to one-tenth the bulk of the calcium phosphate used in the above test gave at once carbon dioxide and reduced the copper oxide to copper. So there is no appreciable amount of organic matter in the calcium phosphate formed above. It should be said once for all that this same precipitate was obtained several times, from both pure and impure lactic acid solutions, and in every case it was examined as here described. But in every case it proved to be pure calcium phosphate.

**Calcium
Acid Lactate.**

The other part (b) of the solution of lactic acid containing the dissolved calcium phosphate was allowed to evaporate spontaneously over sulphuric acid in a desiccator, and there was formed a mass of crystals of the substance which Dr. Kirk calls calcium lacto-phosphate, but which is *calcium acid lactate*. This substance is in this state mixed with some calcium phosphate, some phosphoric acid and some lactic acid and water. It can be freed from the phosphoric acid, the lactic acid and the water by treating it thoroughly two or three times with absolute ether. It can be freed from nearly all the calcium phosphate by dissolving it in water, filtering from the undissolved calcium phosphate and

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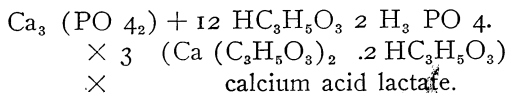
allowing the solution to evaporate again as before. The solid so obtained is nearly pure calcium acid lactate; it is very soluble in water, but insoluble in ether, is acid to litmus paper, and the amount of lactic acid not combined with the calcium can be estimated by titrating the substance with standard alkali and phenol-phthalein as indicated. When allowed to crystallize out from water, it forms generally beautiful sheaf-like forms, which rotate polarized light, and at the same time show beautiful colors. The analysis will be given below.

The same substance was formed when 25 grams of commercial lactic acid, Kahlbaum's sp.g. 1.21, in 400 c.c. water, was warmed with 25 grams of calcium phosphate for some time. The undissolved calcium phosphate was filtered off and the solution boiled, whereupon a precipitate of calcium phosphate was formed in large amount. This was filtered off, and the filtrate was evaporated on a water bath to a low volume and allowed to crystallize. The crystals were digested twice thoroughly with absolute ether to remove the phosphoric acid, lactic acid and water, and were then filtered off and dried in a desiccator. These are the same calcium acid lactate, containing a small amount of calcium phosphate mechanically included. They show the same solubilities, crystal form, optical behavior, chemical behavior, etc.

Finally, the substance was made also, as follows: Pure calcium lactate in water was treated with the theoretical quantity of lactic acid to make calcium acid lactate and the solution was evaporated to crystallization. The calcium acid lactate so obtained had the same crystal form, optical properties, solubilities and chemical behavior.

So there can be no doubt that Dr. Kirk's *so-called* calcium lacto-phosphate is *calcium acid lactate*. But how is this calcium acid lactate formed from the calcium phosphate and the lactic acid?

The following equation will express the reaction:



We may ask, "Is it not surprising that the lactic acid can displace the phosphoric acid in the calcium phosphate; be neutralized by the calcium phosphate and form calcium acid lactate?" We have only to remember that lactic acid has been proved by physical chemical means to be a fairly strong acid, and is present in considerable excess in these experiments, and to remember further that strong acids always displace weak ones from their salts, and it becomes clear that the above reaction is the one that we should expect. So when Dr. Kirk says (page 596, *Dental*

Review, July, 1905), that "the committee did not know that lactic acid cannot be neutralized by calcium phosphate," he was in error in regard to his chemistry.

In the following we have the analyses of the sample of calcium acid lactate made from pure lactic acid (1), and that made from commercial concentrated lactic acid (2). It will be seen as mentioned above that there are small amounts of calcium phosphate mechanically included in these, and the method of analysis gives us a method of determining this amount.

**Analysis of
Calcium Acid
Lactate.**

(1) 0.3040 gm. required 15.60 c.c. N/10 KOH; calculated, 15.28 c.c. (2) 0.2613 gm. required 13.56 c.c. N/10 KOH; calculated, 13.13 c.c. (1) 0.2613 gm. by ignition gave a residue of 0.0630 gm. This required 5.50 c.c. n/5 Hcl and phenol-phthalein to neutralize the CaO, or equals 0.0308 gm. CaO and 0.0322 gm. $\text{Ca}_3(\text{PO}_4)_2$. (2) 0.2786 gm. gave by ignition, treating with HnO_3 , and igniting strongly, 0.0650 gm. solid, which required 65 c.c. N/5 Hcl to neutralize the CaO, or equals 0.0364 gm., CaO and 0.0286 gm. $\text{Ca}_3(\text{PO}_4)_2$.

From 1° and 2° it follows that

(1") 0.2312 gm. calcium acid lactate gave 0.0308 gm. CaO.

(2") 0.2500 gm. calcium acid lactate gave 0.0364 gm. CaO.

$\text{Ca} (\text{C}_3\text{H}_5\text{O}_3)_2$ 2 $\text{HC}_3\text{H}_5\text{O}_3$ calculated found

| | (1) | (2) |
|-----|-------|-------|
| CaO | 14.07 | 14.56 |

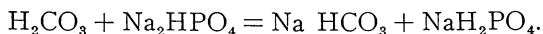
These analytical data, then, show us that the substance is calcium acid lactate, mixed with about 10 per cent. of calcium phosphate.

In his article in the *ITEMS OF INTEREST*, 1902, page 518, Dr. Kirk puts forward a view on the cause of local erosion, ascribing this phenomenon to the action of sodium dihydrogen phosphate, or calcium acid phosphate. In the article in the *Dental Review*, July, 1905, page 602, he again states that the acidity of the exudate from the mucous glands of the lips of people suffering from local labial erosion "is due to the presence of dihydrogen sodium phosphate."

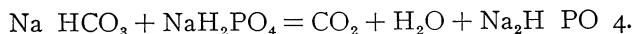
Let us now examine this theory. Dr. Kirk states that "where, through faulty metabolism, carbonic acid is produced out of normal proportion, as in gouty diathesis, then not only the kidney, but also the buccal glands take up this same action, and we have the conversion of disodium

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phosphate into the acid sodium phosphate in those glands, their exudate slowly eroding the teeth." He then gives the following equation:



I must now point out that this reaction proposed by Dr. Kirk is probably incorrect. Carbonic acid can not convert hydrogen disodium phosphate into dihydrogen sodium phosphate. Indeed, if Dr. Kirk were to turn this equation just the other way around, he would have more nearly the truth. The fact is that sodium dihydrogen phosphate and sodium bicarbonate give carbonic acid and disodium acid phosphate, just the opposite from what Dr. Kirk claims. A simple experiment will show this. Dissolve some sodium dihydrogen phosphate in water and add the equivalent amount of sodium bicarbonate. We at once see the vigorous evolution of carbonic acid gas and the solution contains the disodium acid phosphate. The reaction is as follows:



Furthermore, another set of experiments will prove the same point. If Dr. Kirk's hypothesis is true, then, if we introduce a weighed amount or quantity of disodium hydrogen phosphate dissolved in a given volume of water, into a graduated apparatus containing carbon dioxide, the amount of carbon dioxide absorbed in the solution should be that required to saturate the solution (a very small amount) plus the amount of carbon dioxide necessary to convert the disodium hydrogen phosphate into sodium dihydrogen phosphate. When the experiment is tried, the amount of carbon dioxide absorbed is very little more than that necessary to saturate the solution with the gas.

These experiments show, then, that Dr. Kirk's explanation of the cause of local erosion can not be correct. Carbon dioxide can not act upon disodium hydrogen phosphate to form more than a very small quantity of sodium dihydrogen phosphate. The fact is, the reaction takes place in just the opposite way; carbon dioxide and disodium acid phosphate are formed from sodium diacid phosphate and sodium bicarbonate nearly quantitatively. The explanation is very simple. Phosphoric acid and sodium diacid phosphate are many times as strong acids as carbonic acids and consequently displace carbonic acid practically completely from its salts.

Not only is Dr. Kirk's hypothesis untenable, but it is also unnecessary. Dr. Kirk made experiments on the saliva from the labial or buccal mucous glands of those individuals suffering from this particular erosion.

He found acids to be present and phosphates present also. From this he concluded that the acid must be sodium dihydrogen phosphate, but he describes no experiments to show that the particular phosphate is not disodium acid phosphate or calcium phosphate instead of dihydrogen sodium phosphate, nor does he describe any experiment to show that the acids may not be organic acids instead of sodium dihydrogen phosphate or calcium dihydrogen phosphate.

As a matter of fact, if the labial or buccal mucous glands are giving off organic acids, or any other acids, and also phosphates (which they normally do), this saliva would cause the local erosion and would, of course, give the test for acids and phosphates. The only thing necessary for the local erosion is the acid in the saliva, whatever the nature of that acid.

It is clear, then, that Dr. Kirk's hypothesis in regard to the cause of local erosion is not only chemically impossible, but entirely unnecessary to explain the facts.

In conclusion, I would like to say a few words about the probable cause of the general and local erosion. I am continuing the work along these lines and hope to be able to report fully later. But at present I can say that all the cases of erosion that have come under my study have been those produced by acids and not by alkaline saliva. I believe that the particular kinds of organic acids producing the erosion vary with the individuals and even with the same individuals at different times. It seems probable that the acid saliva contains not one, but perhaps several different acids, and the one present in largest quantity will naturally vary with individuals and with the same individual under varying conditions of climate, food and health. Further study will probably show that even other organic acids, not now thought of, are also concerned in this phenomenon. The subject is one of great difficulty and progress can be made only by a great deal of careful experimental work along chemical and physiological lines.





President's Address.

By RODRIGUES OTTOLENGUI, M.D.S., New York.

Read before the American Society of Orthodontists, New York, December, 1906.

Fellow Members of the American Society of Orthodontists:

At the outset let me thank you for the honor conferred upon me by all of you in choosing me as your President for the last year. With me this is no empty phrase, no perfunctory words, but the simple statement of a fact. I have felt greatly honored to be President of this Society, and I do thank you. For what is the American Society of Orthodontists?

Orthodontia is becoming, *has* become a science; a science so entwined with art, that the orthodontist performs the dual function of healing and beautifying the most attractive, the most important part of the human body. Could there be a higher calling?

The Prospect of Orthodontia as a Separate Specialty.

Within the last decade a movement has been inaugurated looking towards the separation of orthodontia from the general practice of dentistry. This Society was organized to assist this project. Orthodontia is to-day already recognized as a separate specialty. The better class of dentists are abandoning the desultory attempts at tooth regulation of the past, and are cheerfully turning over that part of their practices into the care of the orthodontia specialists. And this present status is very largely due to the influence and to the teaching of the members of this society. Therefore again I say it has

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been an honor to occupy for a year the post of chief executive in such an organization, and once more I thank you.

It would be well for us at this time to calmly view the prospect, and gazing along the path of the future to measure the heights which bar the way and the abysses which must be spanned. The future of orthodontia! I doubt if even those present comprehend the vast scope of the work which lies ahead. I know that the general practitioner does not. May I attempt to place before your eyes just a kaleidoscopic view of the horizon as I see it? Let your minds travel back to the landing of the Pilgrim Fathers upon Plymouth Rock! Crossing at last that devoted band felt safe, and fell upon their knees in thankfulness to God. Yet were they safe? They were on dry land at last, yes! But what knew they of the vast continent to the West of them; of the savage hordes in their very vicinity?

I liken you of this society to that little group of men. You have this society, and you are recognized as specialists in orthodontia. In the one you have landed upon the Plymouth Rock of your faith, and in the other you have reached the dry land of your ambition. Do you recognize the immensity of the work yet ahead for this society? Half a century from now, the dental historian will publish the roster of this society and call you the pioneers in the new movement. Pioneers are leaders. Do you know the roads?

In the main the so-called regulation in the past has meant the straightening or aligning of teeth. I state dogmatically that the chief purpose was to correct that which was unpleasant to look upon. To leap the chasm from the distant past to the pregnant present, the real work of the orthodontist to-day is to render as nearly perfect and useful as possible the mechanism of mastication. The mouth is the portal of health, as it too often is the inlet for disease. Food is absolutely required to sustain life, and the more thoroughly masticated it is, the more perfectly will it be assimilated with the least strain upon the other organs involved in the process. That man who has given little thought to this will say perhaps: "What rot; people can chew just as well with crooked teeth as with straight. Don't they always occlude; never mind how crooked they are."

It is this sort of crass ignorance, my friends, that you must go out into the wilderness and preach against. In the first place crooked teeth never occlude, and any set of teeth in malocclusion will perform its function imperfectly in exact proportion to the extent of that malocclusion.

But let us grant for an instant the wrong hypothesis above stated, that people may be able to chew with crooked teeth. The answer is, "Not

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only would the same person chew better with teeth in true occlusal relation, but he will be able to chew with them longer, for every malposition is a menace to the tooth in exact proportion to the departure from normal.

Orthodontia and Prophylaxis. Neither dentist nor orthodontist sees many absolutely perfect teeth, because the happy possessor of a perfect set of teeth would have no need of either.

His sound teeth would constantly contribute to the soundness of his bodily health, and his sound body, with all organs properly nourished would in turn offer no menacing regurgitations to his teeth. Thus the most important phase of prophylaxis to-day not only dental but of general prophylaxis, is the close scrutinizing of dental arches, and reference to an orthodontist that all malocclusions, however slight, may be promptly corrected. Orthodontia is the great preventive measure of the future. It is the prime promise of the abolition of disease. The subject of heredity is too vast a one to be touched upon seriously in this address, but Dr. Rhein, I think it was, who at the last meeting of the Stomatological Section of the American Medical Association prophesied that Orthodontia would in time delimit itself. That as soon as two generations of human beings have perfectly occluding teeth, their progeny will no longer pay us large fees for straightening teeth.

Occlusion in Relation to Physiognomy.

I am fully aware that the art side of our work is important. But I contend that it is nevertheless secondary, and for this reason: There is no definite basis of art; no final measure of beauty; no authorized arbiter as to which is the handsomest countenance. Therefore, one man may alter a set of crooked teeth, and so change the face of the individual as to produce a result entirely in accord with his own estimate of art; a face even pleasing to many. Yet the teeth may not have been arranged so as to occlude.

But we do have a final standard of occlusion, and whenever we can rearrange crooked teeth so that they can be measured by that standard, then we achieve the highest function as a masticating apparatus, place the teeth where they will occupy the safest locations against the ravages of disease, and within five years that face will have assumed a configuration which every one will call an improvement on the original, regardless of what his standards of art and beauty may be. In briefer language, we may beautify a face without doing the best for the occlusion, but if we obtain the best possible occlusion of a given set of teeth, we always attain the most beautiful form of face possible in that individual.

What then is the closest duty pressing upon us as members of this society? It is this. We must cultivate such relations with general practitioners both of dentistry and medicine that we may be enabled to con-

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vince them of two important facts. First, that the orthodontist and not the dentist should do the work. Second, that the dentist, not the orthodontist should find the work.

Dentists should be made to see that the slightest malocclusion is a menace to the future of the dental organs. He should therefore be on the constant watch for malocclusion, and ever ready to advise orthodontic interference as the most important of all prophylactic measures.

A Question of Ethics.

It follows therefore that our relations with dentists, rhinologists and others should be very close, and if close should they not be thoroughly ethical? This brings me to the blot upon our escutcheon.

I have said that the members of this society in the future will be called Pioneers. Would you have those same historians record the fact that we were false leaders, that we were not true professional men, but that we were tainted with commercialism?

When the young dentist fresh from his Alma Mater begins his professional battle, how does he start? How does he build up a practice? Suppose you knew such a young man, and you discovered that he had visited the butcher, the baker, the stationer, the cigar store man, the barber, all the trades people in his neighborhood, and had made the offer of a commission on the bills of all patients sent to him? Would you think that young man was starting out right? If wrong for the young dentist, why should it be right for the orthodontist?

The Question of Commissions.

This question of commissions is to my mind a very serious one, and without bias of any sort it should be calmly discussed, viewed from every aspect, and then definitely settled for all of our members.

There are of course many excuses to be made for those who have given commissions, though less for those that have accepted them. In the first place it is done in connection with other specialties. It has been condemned by the more honorable of medical men, but it has never been stamped out, and is still carried on to a great extent. Indeed to a much greater extent than can be known because the arrangement is generally secret, which fact alone condemns it almost without further argument. No medical man makes a secret of the fees which he receives direct from his own patients for his own work; why then make a secret of the commissions obtained through reference of patients to other men? There is only one answer. No, there are two. Some are ashamed of it. Others who know not shame, realize their patients would never return did they know of these secret fees.

Orthodontia specialists are both few in number and new in the field. Many have given up general and perhaps lucrative practice to take up this



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specialty. Moving into one of the larger cities such a man feels himself a stranger and in a difficult position. Without the countenance and even assistance of the dentists he must make slow progress in building up a paying practice. He consults with the dentists of the place, and many advise him to offer commissions; some even promise him patronage on those terms. Many of the practitioners who have done this are men of standing, men of national reputations. Thus has it been reasonable for our members to adopt this tempting advice coming from such sources and affording apparently the shortest road to success. Nevertheless, I think it has been a grave mistake, and such a mistake as will hamper the life work of every man that follows the course.

Let me put this proposition to you from two aspects, that of the receiver, and that of the giver. First, then, as to the recipient of the commission. Should any honest man accept a dollar which he does not earn? Certainly not. How, then, is this commission earned? What does the general practitioner tell himself that he does for that patient, or for that orthodontist in exchange for that fee, for we have agreed that he must earn it to be entitled to it. The service which he does for the orthodontist is that he provides him with a patient, furnishes him with work. This can not be disputed, and in any similar transaction between trades people, as when a man sends another a customer for a house, the commission is a perfectly honest payment for services rendered. But certainly it is not professional. Wherein lies the difference, you ask? I will tell you. In all business relations the business man acts on his own responsibility; he must safeguard his own interests. The purchaser of a house thoroughly comprehends this at every stage of the transaction. He intends to get that house for as little money as possible. He knows at the same time that the seller will get every dollar he can. The game is open. The agent or intermediary therefore who arranges terms on which the buyer will buy, and the seller sell, injures nobody, and inasmuch as he has contributed to the deal he is entitled to the preagreed commission. With a patient it is entirely different. He places himself, his life, his body, or that of his wife or child, into your keeping. He knows nothing of the conditions. He has faith in you, and acts by and on your advice. If you recommend him to an oculist he goes. If to a rhinologist he goes. If to a specialist of any kind he goes. Has the practitioner a moral right to trade upon that trustfulness, to take a commission, and without the knowledge of that trusting patient?

But the commission taker tells you that he serves the patient because he selects a competent man to do the work. That sounds good, for just about a minute. Does he select that specialist because he knows that he is the best? Or that at all events he is good enough? Or does

he send the patient thither because he gets a commission from that man? If he knew another orthodontist, just as capable, living ten miles nearer to that patient's house, but who did not give commissions, would he send the patient there, or to the man that gives commissions? I am sure that some would say, "I would certainly consult the patient's convenience, if the other fellow was just as good." To such I answer, "Sir, you deceive yourself. You would never think him as good, if he paid no commissions." No my friends, while a hundred excuses have been offered for accepting commissions, I have never heard one that I could not utterly destroy with a logical and convincing response. In the final analysis there is but one reason for accepting a commission, and that is to get money without working for it.

Let us turn now to the question of giving commissions. I frankly admit the usefulness of a commission as a practice builder, for a while. But observe that I qualify that usefulness. After a while the commission scheme will hamper instead of advance progress. Thus there are two sides to this aspect of the question: the utility of commissions, and the moral right to give them.

I am convinced, mainly from the experiences of others that the giving of commissions will lead any man into a most adherent quagmire of difficulties. The ramifications indeed are too great to follow. There is one important tangle however, worth mentioning. I am satisfied by my own experience that the future of the orthodontist, as with the dentist, must depend upon the impression he makes with his own personality, with his own work, upon the people with whom he comes into contact. It is not my custom to mention my own affairs, but I can not refrain from accentuating this fact by so doing here. I have this winter received the majority of my new patients through other patients; three from physicians unknown to me, but who have cared for patients of mine and so have seen my work, and only one patient has been referred by a dentist. True I do not give commissions. But even this one case referred by a dentist, leads us back to the troubles of the commission tangle. The child had been taken to her regular attendant who advised that she is too young, and she is rather young, so that man must not be condemned. But the parents were not willing to wait, and asked the advice of another dentist, who was an acquaintance. This man advised consulting me. The parents then returned to their regular dentist and he acquiesced in the consultation. In quite similar instances known to me both dentists have claimed commissions. Dentists who accept commissions likewise have often demanded commissions for patients recommended by patients first recommended by them. Thus the orthodontist who once starts giving commissions, lays a trap for himself into which he must inevitably



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fall. He ties a chain and ball around his feet which will prevent him from building up his practice along the truest lines, by the recommendation of pleased patients. From the statistics of my own practice above cited, I am sure that this community at least is awakening to the necessities of correcting malocclusions, and that from this time on there will be a rapidly increasing demand in this and other large cities for competent orthodontists. Good practices can be built up without paying commissions to dentists or rhinologists. On the other hand a good business can not be built up in any other manner.

As to the moral side of it, I am sure I am on safe ground in condemning the practice. Every man is entitled to as large a fee as his patient can afford to pay; and conversely every true orthodontist must stand ready to accept many cases for small remuneration, where the patient's means are limited. Therefore we can not do justice to ourselves nor to our patients if we must ever have the idea of a commission in our minds. Men say that they can pay commissions without charging the extra amount to the patient, but in this they are self-deceived. It can not but be a factor in fixing the fee for the wealthy parent, nor can it but hinder us in accepting the child of the poor man. Therefore I argue that the commission method is both unprofessional and immoral.

I feel that I would be derelict in bringing up this topic for discussion, without offering a remedy. Like all cancers it must be cut out, and the sooner the better. And I think that it is the paramount duty of this, the first associated body of orthodontists in the world, to heroically apply the knife and set the standard which all others will feel compelled to follow. Some of our members I have no doubt are fulfilling agreements to pay commissions. Such men of course are bound to keep their contracts in regard to patients already received, but I recommend action by this society which shall prohibit any of our members from ever again receiving a patient upon a commission basis, and I advise the adoption of the following standing resolution:

Resolved, That in the opinion of the members of the American Society of Orthodontists, the practice of paying a commission, honorarium, or any sort of fee in consideration for the reference of a patient is both unwarrantable and unprofessional; and be it

Resolved, That the payment of any such commission, honorarium or fee, by any member of this society shall be sufficient cause for the expulsion of said member, by vote of the Society after conviction; and further be it

Resolved, That in case of co-operation in the care of a patient between a general practitioner and an orthodontist, there shall be no division of fees, but each man shall render a separate bill for his personal services.

It is my view that the spirit of the above should be regularly engrafted within our constitution, either as a part thereof or in connection with a code of ethics which might be adopted, though personally I am opposed to codified ethics, unethical men rarely becoming ethical because of printed rules. For the present, and at this meeting, I think it would be wise to adopt this as a standing resolution.

I believe that a committee should be appointed to so revise our constitution that some of the ambiguous sections therein may be made more explicit. I say this because all the officers during the past year have been hampered in their work because of different interpretations of some of the language of our constitution.

In conclusion I wish once more to thank you for the honor of having filled the post of president for a year. I believe medicine, the art that heals, to be the highest and noblest calling to which man may devote his life. And of all the branches of the healing art, what more attractive, more beautiful, more honorable than to take into our care the children of men, and by our labors to make them more perfect and beautiful men and women?

Discussion of President's Address.

Dr. Chas. F. Ash,
Brooklyn.

I do not believe that the average general practitioner wants to assume the responsibility of doing the orthodontia work for his patient. Personally I have done almost none of it. I have allowed a great many cases to go undone because I did not feel sufficiently competent to attempt the work myself, and there was not a man practicing the specialty of orthodontia near enough at hand to make it possible to refer the patients to him.

Passing on to the question of commissions, your President has in a measure stolen my fire. I have known from time to time of the questions which have been in the minds of practicing dentists and orthodontists about commissions, and as I said before, every question has two sides, but I believe there is very little which can be said in favor of the payment of commissions by professional men: I do not believe it admits of much discussion. I believe the man who is an honest general practitioner of dentistry is not as capable of taking care of the regulation of his patient's teeth as the man who makes it a specialty. So therefore, if he be honest, and wishes to give his patient the very best service, he will recommend him to the man who makes orthodontia his special work. And further, if he is honest, he can not expect a commission.

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Two Claims for One Commission.

I have known of a case in a comparatively short time where the dentist said to the parent, "This little girl's teeth should be regulated." The response was, "Well, Doctor, don't you think you should better go ahead and do it?" The dentist said, "I am not a specialist, and consequently not so well fitted to do it. I would recommend Dr. Jones." A very short time afterward, the father, with the little girl, while walking in the park, met a dentist who is a friend of the family. He picked up the little one and said, "Let me look at you." He said to the father, "This child's teeth ought to be regulated." The father replied, "Yes, I understand that is so." The dentist said, "Take her to Dr. Jones: I will give you a letter of recommendation, etc." Dr. Jones, when called upon, looked over the mouth, saying: "Yes, the child needs the services. It should be undertaken at once." So they proceeded to make an arrangement to have the work attended to. The orthodontist discovered a cavity needing attention. He said, "Here, take the child over to Dr. Smith and have this filling done and send her back to me." "But Dr. Smith is not our regular dentist, only a friend of the family," was the reply. "Dr. Brown is our regular dentist." So over they go to Dr. Brown to have the tooth attended to, and come back. After the orthodontia work is finished, Dr. Jones sends his commission to Dr. Smith, because he believes Dr. Smith recommended the patient. Dr. Brown interviews Dr. Jones, and compliments him on the work he did in that case. Nothing further is said. One day he said: "By the way, has Mr. X— paid his bill yet?" "Why yes," replies Dr. Jones. "Well, I thought perhaps I might have received a check by this time." "Why, I sent that check to Dr. Smith." Dr. Brown says: "Well, I recommended the patient in the first instance, etc." The result was a grand mixup in the matter of commission. I think finally one-half of the commission was allowed each one of the dentists.

As I have already said, I do not think the question admits of much discussion. I do not think a man who is honest with his patient can afford for his own sake, or the sake of his patient, or the sake of his conscience, to be dishonest in the matter of commissions.

**Dr. F. S. McKay,
St. Louis.**

I feel it is somewhat of an unfair advantage to take of one who has as much on his mind as your secretary, to ask him to discuss so important a matter as the President's address. I must confess to a feeling of disqualification.

I was pleased to hear Dr. Ottolengui speak of this Society as a body of pioneers, as I believe that represents, in the truest sense, our position. We are pioneers, and when the history of orthodontia is written, there

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will be no question but that we will be given that credit freely, and be recognized as the pioneers in the true orthodontia. Pioneers of various sorts are historically in high esteem, and I ask, could there be anything more honorable than being known as pioneers in such a field as orthodontia? That is, as being the first men to really apply basic principles to such a work as this, for the betterment of humanity. It seems to me an idealistic position in which we find ourselves. How the real object of orthodontia has changed since first conceived! It used to be considered a matter of looks entirely, or nearly so; now we go beyond; we allow the looks to take care of themselves; if we create or restore normal occlusion, the looks are safe. The real object is to restore, or make possible, perfect function.

I can not help thinking of what a close connection
Fletcherism. there is between this viewpoint and the writings and teaching of a man named Horace Fletcher. He is a layman, a citizen of the world; a man of wealth, who has devoted his energy and fortune to one grand object, namely mastication. His works show a deep and broad study of the processes of mastication, and the physiology of digestion. He carries to excess, you may say, the function of mastication. He would have people chew, and chew, and chew their food, reducing every mouthful to a liquid before swallowing. He would even have you chew liquids, so to speak: he insalivates a mouthful of coffee, tea, wine, or anything else that has taste. He extracts every particle of taste there is in a food substance. His claim is that buccal digestion is thereby made perfect, and every particle of food is prepared for the stomach. Furthermore, one who practises what is known as "Fletcherizing" their food, he claims, would need and consume a much smaller quantity of food than by the ordinary method of eating. If you will watch in any restaurant, you will see that the average person masticates with too little thoroughness. I have experimented in this way, for instance: while eating at the table with a party of people, who were served with the same kind of food, I have noted how many "chews" a certain individual requires to prepare the mouthful of food for swallowing. In one instance of a young lady, frail and anemic, the average was eleven to fifteen for a mouthful of the same character of food that required me one hundred and ten to one hundred and thirty. It impressed me greatly with the average neglect in this function.

I am not a crank on Fletcherism, but if that proposition is correct, and I believe it is, is there not a definite relation between the ability to masticate and the occlusion of the teeth, the apparatus we have to masticate with? If we are going to masticate properly we must have as good a

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masticatory apparatus as we possibly can have, and that is the work of the orthodontist pre-eminently, I believe.

It may seem queer to speak of orthodontia as a prophylactic measure, and yet I believe with our President, it is one of the greatest—if not the greatest of prophylactic measures. The proper contact point, mesio-distally, and those other conditions which go to make up a finely finished case in orthodontia, establish the best prophylactic conditions in the mouth.

Art in Orthodontia.

The Doctor said there are no definite rules for art; therefore the face alone is not a good point for diagnosis from which to treat malocclusion, and I think that is perfectly true. On the other hand, occlusion is a definite thing, and it therefore must be a proper basis for diagnosis and treatment. I wonder, on the other hand, if Dr. Ottolengui realizes how much our ideas have changed in the past few years with reference to art in relation to orthodontia? Types are now considered above everything else, and not any set standards. As Mr. Wuerpel, of St. Louis, has said recently, there is no standard of beauty. It depends upon who is looking at a thing as to its beauty. I therefore feel that in any given type, when we have placed the teeth in normal occlusion we have done the best for that individual, as an individual, that we can possibly do in our own sphere of action.

Commissions.

As to this matter of commissions, I am glad it has been brought up. I feel that the time has come when definite action one way or the other is called for. It is hard for any one of us in his own community working alone to establish a new order of things. We are simply units here, there, everywhere, all over the world. But when action is taken as a body, each man in his own community feels that he has the moral support of all to back him up in his position. The best way to make changes is by concerted action.

In the main I agree with the essayist, and yet I feel that there are arguments which are familiar to most of those present, which would render this practice not altogether unwarranted. I believe, however, that the standing of orthodontia would be raised and bettered by the abolishment of commission giving in any form of division of fees.

Dr. Milton Watson, Detroit.

I desire to express my profound appreciation to Doctor Ottolengui for the courageous and judicious manner in which he has handled a delicate subject, my only regret being that the matter did not receive similar attention years ago, before the evil became so thoroughly rooted.

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I began my practice by giving a commission, as did nearly all the members of this Society, and I continued it long enough to see the many evils associated with it. To enumerate them would simply be to repeat many of the points so clearly brought out in the address. I could, however, relate some additional experiences, showing its tendency to make men deceitful, and deception has no place in the professional man's career. One with any sense of honor must at times have been keenly embarrassed, who has ever been a party to any "commission arrangement," regardless of whether he has given it or received it.

The impropriety of being connected with a plan of such a character finally became clear to me, and I determined to discontinue it, and made an announcement to that effect to every dentist from whom I had ever received patients. It is only fair to say at this point that there were a number of men who never accepted any commission, and still others who soon saw the evil of such an arrangement, and asked that it be discontinued. I believe arrangements whereby one either offers or receives "inducements" of any character for the reference of patients is positively and unqualifiedly wrong, and I hope every man in this Society will hold up both hands for the adoption and rigid enforcement of the resolutions offered by our President.

When I was speaking before, I said Dr. Ottolengui has stolen my thunder; I meant this. I have given this matter of commissions some thought, and to this extent: I had no knowledge that Dr. Ottolengui was to introduce this resolution, but had already arranged in my mind a resolution which I intended presenting before the meeting of the Second District Dental Society, along the same line, against receiving commissions. I believe with the President, that the only way to get rid of this commission business, is to absolutely "cut it out," and the only way to do that is to cut it out from both sides. If the American Society of Orthodontists will put their members in a position where they can say to men sending them cases, that they are compelled to refuse paying commissions, under penalty of losing their standing or membership in their Society, it will be a step made in the right direction. Then, too, I think the dentists should be in the same position, and I propose that such a resolution shall be presented at our next meeting, which I hope you gentlemen will attend. The resolution will come up for action at the following meeting. I want the moral support of your presence when the resolution is read.

**Dr. Casto,
Cleveland.**

I am heartily in favor of the resolution as presented by Dr. Ottolengui, and am thoroughly in accord with the movement. As regards experiences, I have not had a great many. I have paid some com-

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missions. It was my intention to treat all the dentists alike, but I found, as I had been informed, that a great many of the men would not accept commissions in the community where I was located. I gave commissions because I had been led into it by the older men in the specialty. I understood at the beginning of my career, that it was a custom followed by most of the men. I understood it was legitimate and fair, and I felt it was at that time, but as I see now, and I have felt for several months, it is something which should be terminated, and I believe this is the time to terminate it. As Dr. McKay has said, we feel we need the moral support of the Society of Orthodontists behind us.

In regard to this address, I think we are all very proud of the courage Dr. Ottolengui has shown in bringing the matter of commissions up as he has done. I think we are fortunate also in that he is

able to view the question from both sides, from that of the general practitioner as well as from the standpoint of the specialist.

It seems to me that one of the main points in this matter is the question as to the service that is rendered. It is the duty of any man to his patient to refer him where he can get the best services, in case it is something he does not wish to do himself, and that is a service which can not be paid for. I would feel most degraded to accept from one of my patients a fee for referring him to some other man for work I do not wish to do myself, and I have had occasion to send many patients for special services. That is a service which I owe that patient: it is a question of honor between myself and the patient, and no fee can compensate for it.

In talking this matter of fees over with a prominent surgeon, and as you all know it is a matter which comes up there also, as I am told some surgeons pay commissions, he took this stand: He says you have no right to accept any fee from a patient without telling that patient what the fee pays for. If you are willing to discuss the matter with the patient, then you are honest, and if the patient chooses to give you the fee with that understanding, it is all right. For instance he says, "I often give part of my fee to a physician, but I never do that without explaining the matter to the patient. I say to them: "So much of the amount it will cost you is for me for the operation, and so much of it is for the physician who takes care of you afterward. That commission pays for something; for the care of the patient." In the same way I can see where an orthodontist might be justified in giving a commission, or rather, dividing the fee, but not for referring the patient.

I am glad to have the opportunity of indorsing this resolution: I hope it will be carried, and certainly think it is the opportune time for it to be adopted by this Society.

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Dr. Varney E. Barnes,
Cleveland.

Dr. Ottolengui has brought up points which are vital to the specialty of orthodontia. Look at this matter of commissions! We have limited ourselves to the practice of orthodontia, and have cut off all the rest of dentistry.

If we are to adopt this resolution we must make it binding on ourselves, and the men outside this Society as well. If the resolution goes through, a copy of it should be sent to every dental magazine and published.

I believe when the resolution is taken up, it should clearly differentiate between a commission and the division of a fee. The division of a fee must be known to the patient, and the man who gets a part of the fee—say the dentist—must do some actual work in the case; he must take charge of and assume a part of the responsibility.

Dr. Alfred P. Rogers,
Boston.

I feel that this Society, with such noble aims and principles, will have washed the only stain from its garments when it has adopted this resolution.

I feel greatly encouraged, because not long ago when I started as a specialist in this work, I determined to enter the field as cleanly as possible, and I offered no commissions, nor will I do it. I stand or fall on that principle. Possibly a practice might be secured sooner by following the other plan, but not better.

I want to thank Dr. Ottolengui personally for bringing this matter up. It is an opportune time. The Society is in a position to accept this resolution; in doing so it is going to put us on such a high plane of professionalism that no man can raise a finger against us. We will do clean work founded on noble principles.

Dr. J. Bond Littig,
New York.

I was surprised to hear the President make this reference to commissions. It has all been a surprise to me. I did not know commissions were ever given!

I have gone so far in my own practice as to refuse to take any money in advance from the patient. If he paid a part of the fee I was obliged to carry the work ahead under any circumstances. On the other hand, where no payment had been made in advance, if the patient did not do as I told him, and put himself completely under my charge, I could dismiss the case.

I did not know a commission was ever offered except by hotel men. A hotel man came to my office with a Cuban; he said he wanted me to correct the boy's mouth in a certain length of time. The patient had to go back home in a short time. The hotel man wanted a commission for bringing him to me. I said, "I can not do the work in the time specified, and as to a commission, you will have to go somewhere else." The thing

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you discharge your cook for when he goes to the grocer, I am surprised to find being discussed here.

If a man sends a patient to me to secure my services in the regulation of his teeth, or any other services of which I might make a specialty, and expects me to hand him a commission, I would not take the case under any circumstances.

Dr. Eloyd S. Lourie,
Chicago.

I would like to say a good deal on the subject of commissions, but am afraid I am not a clear enough thinker to extemporaneously clothe my thoughts as I would wish to present them. I want to express my appreciation of Dr. Ottolengui's address, and for his fine wording in setting forth our ideals. Our ideals may be epitomized sometimes in someone's else words, and thus brought home to us more forcibly than we would ordinarily conceive them.

I wish to heartily indorse the idea of our President as to the matter of commissions, and I think there will certainly be no dissenting voice to the passage of the resolution. I think Dr. Barnes's suggestions are good with reference to sending this resolution to the dental societies.

Dr. D. Willard Flint,
Pittsburg.

I want to add a word of testimony along this line. The only sleepless night I have had since I engaged in the practice of orthodontia was because of this commission business. When I started a year ago to specialize, I "cut it out," and during that time never gave anything. Over a difference as to sharing fees I feel I have lost the influence of one man that I valued very highly.

I can not sufficiently express my delight that this has been brought up at this meeting. We talked it over around the dinner table at Chicago, and it was hashed and rehashed, but now we can see the solution to a serious problem, especially serious for the young man just beginning. I felt a great relief when it was brought up here, so that we can have some backing when we stand for what we consider a better standard of ethics.

Dr. F. H. Pullen,
Buffalo.

It is with much pleasure I listened to his very able address. The President brought out very prominently in his paper the subject of commissions, although he has at the same time presented before us our highest ideals and aims. I am sure we all feel grateful for the good he has done us with his Journal; I fear we are not half appreciative of this good. I believe the Society could not have made the advancement it has in the past few years without the aid of ITEMS OF INTEREST, the pages of which have been given so willingly, regardless of the expense of the illustrations and text.

Concerning commissions, we all know we have made errors in the

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past, and I am sure from the applause to the remarks that have been made on this subject, that our hearts are all tuned to the same key in wishing to abolish the commissions absolutely from our practices.

I believe if the Society takes this action, as recommended in the resolution of the President, and by motion, that it will be the first Society on record to express itself in this manner, and in future we shall look back with much pride on the record established in this matter.

I am glad the President has invited me to speak.

Dr. F. H. Baker,
Boston.

I wanted very much to speak on this subject, but not being a member of the Society I am situated much like the Scotchman who was groom for a gentleman.

The gentleman went out to order his horse and found the Scotchman drunk. He said, "You are drunk!" "No," the groom replied. The Scotchman then grew angry. He said, "I am not drunk. Got! I wish I was!"

I am much interested in the subject. I have been practicing orthodontia for thirty years. While not a specialist exclusively, I have for the past ten or fifteen years made it my exclusive work almost entirely.

The matter of commissions is a serious subject with me. I do not believe in commissions, but as stated by your President, there are two sides to the question. I may quote two cases that came under my observation. Something like fifteen years ago a dentist brought a case to me for orthodontic services. I told him, in reply to his question, that I did a good deal of that work. "What commission am I to get out of it?" he says. "What do you want?" was my reply. "What you usually pay." I said, "You are the first man who ever asked me to pay him a commission." He was disgruntled, and I lost the case.

The next case I recall was sent me by a friend only a few years ago. I asked if he wanted anything out of it. He said, "Doctor, I do not feel just as though I should take a commission, but a man can not turn over a case without giving it some of his time." There is some truth in that, too. I think the line to work along is to get the general practitioner to realize that it is unethical to receive a commission. There are many times when we would have to pay a commission or lose a case, provided Dr. Smith and Dr. Jones are paying commissions.

Dr. F. C. Ferris,
Brooklyn.

I am heartily in accord with everything I have heard here to-day on the subject of commissions. It is of particular interest to me, as I am just starting in the practice of orthodontia as a specialty. I recently returned from Dr. Angle's School, and to say I am enthusiastic would be putting it very mildly. I have endeavored to practise orthodontia in the past, but as I look at my cases now, after my education in the

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West, I feel my efforts have been almost lost. I am anxious, I almost feel, to take up the case of every patient I have ever worked for, and do the work over again.

Dr. F. C. Kemple,
New York.

So far as experience in commissions is concerned, my own has been nil. I have never given a commission. When I came to New York to practice orthodontia I was somewhat at sea on this question.

I did not know whether to give commissions or not. In this uncertain state of mind I consulted a dentist here in New York, and this gentleman told me that he had never accepted a commission. He said if a commission should be sent to him by a specialist he would return that portion of the fee to the patient, as he had done on one occasion, because he would feel that he had done nothing to earn that percentage, and if the orthodontist had been remunerated for his work by that portion of the fee which he had retained, the portion which had been paid as a commission was an overcharge which rightfully belonged to the patient. He therefore advised me not to pay commissions, but to take that much off the fee for the patient, and gentlemen, I thought his advice was sound.

I have located here in New York, and I pay no commissions nor divide fees, nor present the dentist who refers the case with a beautiful hunting or fishing outfit, because I believe the honest, conscientious dentist, who has ideals and lives up to them—and, by the way, there is a great difference between the man who preaches ethics and the man who lives ethics—does not want a commission.

In the case cited here this morning where the dentist picked up the little child who was playing in the park, and glancing at her mouth, told the father that the child should have her teeth regulated, if that man made two hundred dollars in that way it is an easy method of making money. I use the term “making money” advisedly, for this “professional gentleman” certainly did not earn the money through professional knowledge, skill, or service. It is clearly a case of accepting money without giving value received.

There may be some slight responsibility attached to the dentist who refers a patient to a specialist. If the specialist lacks ability and his operations result in failure it reflects unfavorably on the dentist who recommended him, but money does not compensate for such responsibility. The dentist should make it a point to know the ability of the specialist to whom he refers his patients.

I feel very much in accord with the sentiment expressed at this meeting in regard to the commission proposition.

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**Dr. O. W. White,
Detroit.**

The resolutions as advocated by the President in his address to-day can not but meet with general approval from the society.

As I have just entered the profession of orthodontia, it is impossible for me to speak with experience on this subject.

I have talked with a number of orthodontists who have come to grief from this practice. My neighbor Dr. Watson tried the plan of giving commission for cases referred to him. He has told us of the embarrassing positions he has been placed in. When these conditions exist there must be something wrong, and if wrong should be stopped.

The only man who has advanced any sort of solution to this problem was Dr. Dodson, of Grand Rapids. A dentist is entitled to remuneration for time spent on a case and he may render a bill for service or consultation. But this bill or statement should go to the patient, not the orthodontist, as service was rendered to the patient.

It is very important that this question should be settled now before the evil grows, so that the professional standing of dentistry and orthodontia are not injured by it.

Dr. Ottolengui.

I am more than ever proud of being President of such a lot of fellows. I want to discuss primarily the matter of the division of fees. There must be absolutely no such thing as the division of fees. On that point let me make my position perfectly clear. The dentist, in a technical sense, makes a division of fee with the laboratory man when he sends a certain portion of a given piece of work to the laboratory to be done, and the patient knows nothing about it; often he does not even know the laboratory assistant; there is an agreement between the dentist and the laboratory man to do a certain share of work for a certain sum of money, but it is no division of fee; that is paying the laboratory man for specified work. The responsibility remains with the dentist.

In the course of your work if you find it necessary to have something done by a dentist in the mouth of your patient for which you are responsible, you must pay the dentist for it. Make no division of fee, but pay the dentist his fee for the service which he renders.

There is only one circumstance where I can imagine a rightful division of a fee. That is where a dentist is taking care of a patient in an adjacent town; he has some capabilities but he wants your supervision of the work, your advice, and wants you to put on the appliances and tell him what to do. You should send the bill for your services to the patient; and the dentist should send the patient his bill for his work.



The Anesthetization of Dental Pulp by Nerve Blocking and Pericemental Injection.

By Dr. HAROLD S. VAUGHAN, New York, N. Y.

Read before the Central Dental Association, October, 1906.

About five months ago, through the courtesy of my friend, Dr. F. L. Fossume, I had the opportunity of meeting Dr. Kjennerud, a dental chemist of Norway, who was in this country in the interest of a local anesthetic which he had discovered. He claimed that by the injection of one or two minims around a tooth, the pulp would be anesthetized and that the most sensitive cavity could therefore be excavated without pain.

Dr. Kjennerud introduced his remedy into Norway and Sweden about one year ago, certain dentists paying him large sums for the exclusive right. It was his intention to make similar arrangements in this country, after completing his European contracts. With that end in view, he most zealously guarded his secret and returned home without leaving a drop of his preparation behind. He consented, however, to give a demonstration on a patient secured by Dr. Fossume. The cavity was a mesial one in a right upper central incisor, and proved to be very sensitive; but after the injection of a small quantity through the gum on the palatal side the operation was rendered entirely painless.

Two or three days later, I secured a patient with an exposed pulp in the left upper second bicuspid. After Dr. Kjennerud had made an injection I was able to painlessly remove the pulp.

Dr. Fossume arranged for two other demonstrations, one of which was not so successful. The reason given by Dr. Kjennerud was that he

had a new technique, suitable for certain cases, that could not be divulged at this time.

After discussing the matter with Dr. Fossum, I decided to carry on some experiments with the various local anesthetics, both alone and in combinations, in order to try and get a solution of greater anesthetic power than cocaine alone.

As a basic solution I used a normal saline 3-4 of 1 per cent., to which was added enough adrenalin to make a 1 in 1-30,000 solution, a saline solution being less irritating to the tissues than plain water.

The adrenalin chlorid acts powerfully as a vaso-constrictor, increasing the duration of anesthesia. To this basic solution I added cocaine hydrochlorate, tropocaine and the following synthetic anesthetics: Stovaine, betaeucaine and acoine in combinations, injecting them in my arm in five minim doses and studying them as to duration and area of anesthesia, amount of irritation produced and after effects. I will not attempt to give the result of all the injections, though I found that various combinations of the synthetic anesthetics and combinations with cocaine were no more potent than the single solution. I have tabulated the effects of the single solution:

| <i>In basis solution.</i> | <i>Duration.</i> | <i>Area</i> | <i>Irritation.</i> | <i>After effects.</i> |
|---------------------------|----------------------------|-------------|-------------------------|--------------------------------------------------------------------------------|
| Stovaine 1 p.c. | Anesthesia for 2 hours | 2 cm. | Erythema lasting 3 days | Soreness on pressure for 3 days |
| Acoine 1 p.c. | Anesthesia for 2 hours | 1.5 cm. | Marked erythema | Soreness on pressure with skin slough over site of injection 4 mm. in diameter |
| Eucaïne B. 2 p.c. | Anesthesia for 2 hours | 1.5 cm. | Hyperemia 3 days | Soreness on pressure 3 days |
| Tropocaine 1 p.c. | Anesthesia for 1 hour | 1 cm. | Slight hyperemia 1 day | Soreness on pressure 1 day |
| Cocaine 1 p.c. | Anesthesia for 2½ hours | 2.5 cm. | Slight hyperemia 1 day | Soreness on pressure 1 day |

As a result of these experiments I found:

1. Cocaine to be superior in anesthetic power.
2. Less irritating.
3. Milder after effects than any of the synthetic remedies; while tropocaine, which is an associated alkaloid, is much less potent in anesthetic power.

I then made as my regular solution one containing cocaine, 1 per cent., phenol 1-400, and adrenalin chloride 1-30,000 in the normal saline solution.

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The phenol increases the anesthetic power of the cocaine in addition to being antiseptic and preventing the development of fungi in the solution. This combination seemed to be the most satisfactory and is the one used in my experiments, though I have made some two, three, four and five per cent. solutions.

We will next review briefly the anatomy of the pericementum and alveolar processes, together with the nerve supply of the teeth:

Anatomy of Processes.

The alveolar processes are made up of two plates of compact bone, the external and internal; the space between these plates is occupied by the alveoli or sockets of the teeth. The long partitions between the alveoli are less dense than the plates, making it possible to penetrate this spongy bone for a certain distance, with a sharp syringe needle. The alveolar process is covered by periosteum, which dips into the alveoli, forming the dental periosteum or pericementum which is firmly adherent to the wall of the alveolus and cementum of the tooth, thus holding the latter in place.

At a point just within the margins of the alveolus, the fibrous tissue passes horizontally between the root of the tooth and the alveolar wall, while toward the apex they pass obliquely, being attached to a point higher on the root than the alveolar wall, so that the tooth is swung in its socket. The fibres around the apex are spoken of as the alveolar-dental ligament.

Vessels of the Pericementum.

The pericementum is a highly vascular tissue, deriving its blood supply from three sources:

1. From the vessels at the apical end of the root.
2. By vessels from the alveolar periosteum.
3. Through vessels of the Haversian canals in the alveolar walls.

The gums are made up of highly vascular dense fibrous tissue, firmly adherent to the periosteum beneath, and covered by mucous membrane.

Nerve Supply of Teeth and Gums.

The *nerve supply* of the teeth and gums is through the second and third divisions of the fifth. The superior maxillary nerve, while in the sphenomaxillary fossa, gives off the posterior dental branches which accompany the posterior dental artery. On the zygomatic surface of the maxilla small filaments pass to the gums and adjacent mucous membrane of the cheek and antrum while others pass through the posterior dental canals to the molar teeth. The middle dental branch is given off from the superior maxillary nerve on the posterior part of the infraorbital canal; it is directed downward and forward in the canal on the outer wall of the antrum to the bicuspid teeth. The anterior dental branch arises near the infraorbital foramen and passes down the canal in

the anterior wall of the autrum to the incisor and cuspid teeth. These three nerves form anastomotic loops from which branches descend through the small bony canals to the apical pericementum, where they divide; some filaments enter the apical foramen to ramify in the pulp, forming a plexus beneath the odonto-blastic layer; other branches ramify through the pericementum, anastomosing with filaments from the gums and alveolar periosteum. The posterior part of the hard palate, with its overlying gum tissue, is supplied by the anterior palatine nerve from Meckel's ganglion which descends through the palato-maxillary canal, while anteriorly it is supplied by the nasopalatine which passes downward along the side of the vomer, through the anterior palatine canal and Scarpa's foramen.

The mandible is supplied by the inferior dental nerve which is a continuation of the posterior trunk of the inferior maxillary nerve. It passes beneath the lower border of the external pterygoid muscle to reach the interval, between the ramus of the jaw and the internal lateral ligament, where it enters the inferior dental canal which it traverses, sending branches to the teeth, gums and body of the bone. At the mental foramen, which is situated on a line with the root of the second bicuspid and midway between the superior and inferior borders of the jaw, the nerve divides into incisor and mental branches, the former supplying the incisor and cuspid teeth, while the latter emerges to supply the gums, chin and lower lip, communicating with the facial.

From the above review, we see that the dental pulp may be anesthetized in several ways:

**Methods of
Anesthetizing
Pulps.**

1. By injection into the pericementum, the needle entering the gum near the neck of the tooth and then being directed against the root of the tooth to be anesthetized, the solution reaching the nerve as it enters the apical foramen.
2. By penetrating the outer or inner alveolar plate, opposite the apex, and then injecting.
3. By direct injection where the pulp is exposed, as in pressure anesthesia.
4. By injecting around a nerve at a proximal point and thus blocking the impulses; as, for instance, injecting around the inferior dental nerve at the mental foramen to anesthetize the teeth distal to this point.

The inferior dental foramen is situated at a point too far back to be reached in this manner. Deep injection at the tuberosity of the maxilla would probably reach the posterior dental nerves. The middle dental can not be reached readily as its groove lies on the inner surface of the outer wall of the antrum.

As the anterior dental nerve is given off from the infraorbital canal

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near the foramen, it can be reached by injection into the infraorbital foramen. Such injection anesthetizes the superior incisor and cuspid teeth and, probably, the bicuspid through the anastomatic connections. Of course injection at this point anesthetizes the palpebral, nasal and labial branches, producing anesthesia of the upper lip, side of nose and lower eyelid.

The syringe should be all metal with strong finger rests, and a large end on the plunger to fit the hand. The needle must be rather small, of the best quality steel, with point well sunken into the shank.

Technique of Pericemental Injection.

The spongy bone between the sockets is less dense than the compact inner and outer plate; the needle should therefore be inserted near the base of the festoon that dips into the interproximal space, preferably on the labial and buccal side for the lower teeth, and the palatal for the upper. It is forced slowly in, at the same time injecting a little of the solution ahead, thus minimizing the pain of insertion. The point is then directed into the pericementum as high up on the root as possible; the spongy bone can usually be perforated thus, allowing the needle to reach the root at a point higher up. Several minims are then injected, using considerable force to drive the solution to the apex, thus anesthetizing the nerves as they enter the apical foramen.

The second method, that of penetrating the outer or inner alveolar plate, opposite the apex, and injecting the apical tissues, I have not had occasion to try as yet.

The third method, that of injecting directly into an exposed pulp, is useful in those cases where the pulp has been only partly anesthetized by the pericemental injection. It can then be easily completed in this manner.

At the present time I have used pericemental injection for pulp extirpation in thirty cases, and in that number have anesthetized molars, bicuspid, cuspids and incisors, as shown by the following list:

| | |
|-----------------------------|---|
| Lower third molars | 2 |
| Upper third molars | 3 |
| Lower second molars | 2 |
| Upper second molars | 2 |
| Lower first molars | 3 |
| Upper first molars | 3 |
| Lower second bicuspid | 3 |
| Upper second bicuspid | 3 |
| Lower first bicuspid | 2 |
| Upper first bicuspid | 2 |

| | |
|-----------------------------|---|
| Lower canines | I |
| Upper canines | 3 |
| Lower lateral incisors..... | 2 |

The fourth method, that of blocking the nerve impulse at a distance, I have carried out successfully at the mental foramen, the teeth being anesthetized as far as the median line on the side of injection and back to the second bicuspid. As yet I have not observed if the anesthesia extends beyond this tooth.

For the majority of cases, I find a 1 per cent solution strong enough; in others, a 2 per cent. is better. I have used as high as 4 per cent. and 5 per cent., but do not consider this necessary. When using the strong solution, or a large amount of the weaker ones, I usually give from 3 to 10 minims of Volasem.

Formulae.

| | |
|------------------------------|----------|
| Cocaine hydrochloratis | gr. x |
| Adrenalin chloridi | m. xv |
| Sodii chloridi | gr. viii |
| Phenol | m. iiij |
| Aquae sterile qsad | dr i |

The solution must be kept in amber colored bottles, away from the light.

**Indications for
Pulp Anesthesia.**

Pulp extirpation is the most important one, as in cases of pulp exposure, where its removal is necessary. Instead of using arsenic trioxid, with its uncertainty as to the amount of pain it will cause and the length of time it will take, the pulp can be immediately anesthetized and removed, the root being filled at once if necessary. Of course the rubber dam should be applied and aseptic precautions observed, to avoid infection and a resulting pericementitis. Other indications often arise, such as the grinding of a vital tooth for crowning hypersensitive cavities, etc. Of course, this is not at all necessary in the vast majority of cavities as the pain of their preparation is scarcely more than that of the needle insertion necessary for the above.

This paper is simply a brief resume of my experiments up to the present time.

Cavity Preparation for Porcelain Inlays.

By CLYDE DAVIS, B.S., M.D., D.D.S., Lincoln, Neb.

Read before the Colorado State Dental Association, Denver, Colo., June, 1906.

In presenting to you the now almost threadbare subject, porcelain inlays, we can not reiterate the extravagant claims we have heard and read on this subject, as experience has not borne them out. However we must insist that porcelain inlays have their place and that there are methods of cavity preparation, that will invariably retain this class of filling.

The order of procedure in cavity preparation for porcelain does not differ from that where the metals are to be used. They are:

First requirement, access; second requirement, outline form; third requirement, resistance form; fourth requirement, retentive form; fifth requirement, convenience form; sixth requirement, toilet of cavity.

But the essential differences come in a modification of each step, hence a modification of the rules governing each step in the procedure.

Adequate access is essential in the use of all filling materials, and the more unyielding the material used, and the larger the bulk to be inserted at once, the more complete and easy must be the access, so that in the insertion of inlays, of whatever nature, "access form" reaches its maximum. Chief among the means to gain access is separation, easily attained by the use of ligatured cotton, gutta percha packing, or immediate separation by the use of mechanical separator, all of which should be frequently resorted to when using *any* filling material, if we have any regard for contact point, tooth form, restoration and the prevention of recurrence of decay.

Access.

Let us consider the rule for cavity preparation where the common fillings are to be used, and note the slight changes made necessary for the use of an inlay, porcelain or otherwise.

Outline Form.

For the metal foils or amalgam. *The cavity should be a combination of flat walls of dentine, coming together at angles the least bit acute surrounded by an enamel line which is made up of the largest curves permissible.*

For inlays of porcelain or metal, the cavity should be a combination of flat walls of dentine, coming together with *rounded* angles, the least bit *obtuse*, surrounded by an enamel line which is made up of the largest curves permissible.

You will note that the only modification in the rule is the rounding

of all line and point angles and changing the pitch of the walls to these angles, the latter modification entirely destroying the principles of retention used in the ordinary filling in one direction only.

Resistance Form. This is the weakest feature in the inlay proposition, and is best overcome by so preparing the cavity, that *"the access to the cavity is on the same line with that from which the filling is to receive its greatest and most frequent stress."* When this is possible the inlay may be subjected to great stress without the slightest injury, but when possible it must be protected from excessive forces, or else its use is contra-indicated. It would thus follow that cavities simple or complex, involving the occlusal in molars or bicuspid, should move to exit only toward the occlusal. (See Figs. 1, 2 and 3, as illustrative.)

Incisal restorations should move to exit incisally only, while the approximal cavities in the six anterior should move to exit lingually only as in Figures 4 and 5. They may move to exit labially as in Figure 6, only when the caries of the cavity involving the lingual wall is not



FIG. 1.



FIG. 2.



FIG. 3.

extensive, and only sufficient to perfect our extension for prevention, in reaching a habitually self-cleansing surface.

Retention Form. As before stated in bringing our cavity walls to meet at obtuse line and point angles, we have completely destroyed all retention made necessary to obtain "draw," that the matrix as well as the filling may move in and out of the cavity without meeting resistance till that resistance is desired, and here we come forward with our cement and induce resistance to exit at the proper time as a final operation. We wish here to suggest that the retention of an inlay depends upon: (A) Friction of parallel planes with an adhering matrix; (B) The adhesion of the cement; (C) Mechanical retentions in all directions but the one of exit, which we have attempted to illustrate in Figures 2, 3, 4, 5, and 6. As to the principle

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of friction retention which we here advocate as the main factor in the retention of inlays, it would follow that "The friction increases (hence the retention form) as we increase the number of parallel planes which have to pass before the inlay may change its direction of exit, also the extent of said planes and closeness of their adaption.

We are aware that this is a principle not advocated by some men prominent in porcelain work who advance the theory of adhesive cement as alone responsible, but cement alone has failed us, while the principle of friction on parallel planes will hold in place an inlay where fine particles of cement only intervene, till further decay gives chance for movement in a new direction.

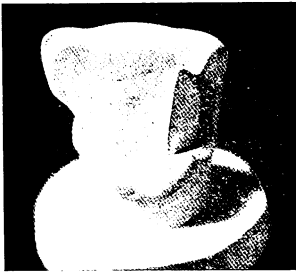


FIG. 4.

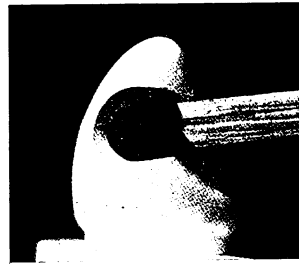


FIG. 5.

As to the adhesiveness of cement there is no doubt but that it is a factor in the retention of inlays, but it is mainly mechanical. While plastic it is easily introduced, but when set before the inlay can move it must slide on roughened walls or rotate in broken masses. It has the additional function of closing the joint and thereby removing the conditions for recurrence of decay. We prefer a coarse grained quick setting cement, a good resister of the oral fluids, but for its adhesiveness we care less, as all cements we have tried have failed to retain an inlay, when we have ignored the principle of "friction between parallel planes."

Convenience form is largely considered under access, yet it comes in again here: when we have completed the inlay an additional wedging may be necessary for final adjustment.

Toilet of the Cavity.

For filling other than inlays, the toilet of the cavity will come just before inserting the filling, while with inlays it is divided.

The consideration of the cavo-surface angle comes before the shaping of the matrix. Each filling material calls for

a different cavo-surface angle, for "*as the edge strength of filling material decreases, so increases the cavo-surface angle.*" That angle in cavities for metal especially, a metal inlay, may be very obtuse, as the edge strength of the metal is superb; while with the porcelain inlay a good rule is the right angle cavo-surface angle, as it is a question which has the greater strength, a porcelain margin or an enameled margin supported by dentine.

The remainder of the toilet of the cavity, its medication with antiseptics, alcohol and chloroform, must come just before final drying for the insertion of the inlay. Herein lies one of the inherent features of inlay work as all cavities should receive a chiseling of their margins after any moisture has reached them before final filling, which is not possible



FIG. 6.

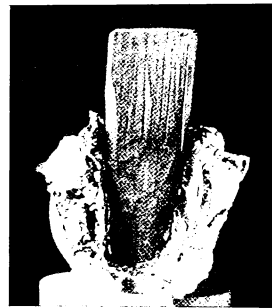


FIG. 7.

unless tooth is under the rubber from the beginning to the end of the entire operation, which would remove the main reason for using gold inlays (avoiding long sittings) and would be entirely out of the question, in using porcelain, owing to change of colors in desiccated tooth substance.

Before closing let us consider a method of making a matrix which will prove successful in any case, provided you move same to exit in one line only. By this method you may form a matrix without tearing same even though the cavity involves a part of an enlarged root canal.

The technic is as follows: Shape up a stick of soft pine to approximately fit the deepest recess of cavity. To make it more accurate add modelling compound impression (see Fig. 5), withdraw and shape up the matrix with the fingers and burnishers as in Fig. 6, place in position as in Figure 7.

Method of Forming Matrix.

Tease the matrix away from stick or impression, withdraw stick and use burnish method for balance, care being taken to pay attention to the deepest portion of cavity first. This method will make an inlay with porcelain post without rupture of matrix. Post may be strengthened by

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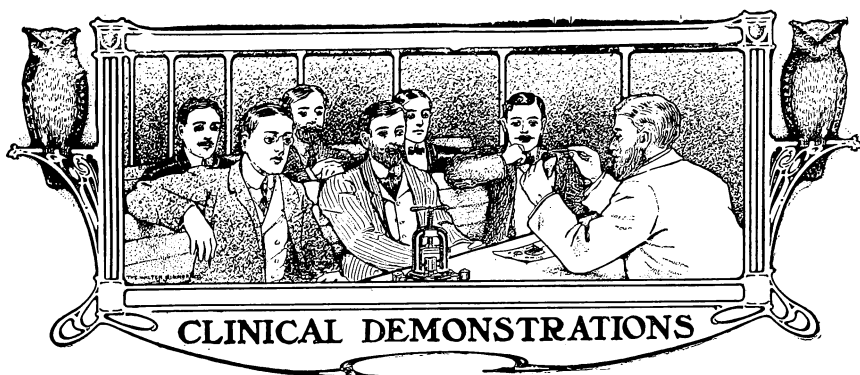
simply dropping an iridio-platinum pin into matrix, allowing it to stand above the junction of cavity and incorporating it in the body. If matrix is difficult to remove inspect your cavity for undercuts on line of exit. Dr. Allen's method, the use of gum camphor, will assist.

As to the fusing of porcelain attention is called to the article "Some Phenomena Observed in Fusing Porcelain," by Dr. J. I. Byram in *The Dental Review*, March, 1906. It is a radical departure in the teaching of porcelain new to date, yet every experience fully agrees with his deduction from extended experiments, which we append.

1. That porcelain has no definite fusing point.
2. By prolonging the time of exposure to heat, a thoroughly fused porcelain may be obtained at comparatively low temperature.
3. That porcelain fused at a low temperature for a long time will maintain its characteristic color.
4. That low fusing porcelain can be made of high fusing porcelain by repeated fusing and grinding.
5. If a piece of porcelain is thoroughly fused and more porcelain added and fused the first layer will be slightly overfused, etc., etc.

From this it would seem that porcelain acts not unlike vulcanite rubber, and that the best furnace is the one which makes it possible to gauge our heat exactly and to hold the desired temperatures, varying the time at will.





Repairing Fractured Crown and Bridge Facings. New Method.

By W. FRANCIS MELLERSH, London, England.

There being nothing new under the sun, the following method about to be described may have occurred to other operators. I believe, however, it is original, inasmuch as I have not discovered any previous description of a similar one.

This process was tried by me five years ago to meet the exigencies of a difficult case where the facing had become detached from a first pre-molar crown. Since then it has been adopted in a number of cases with increasing satisfaction. A troublesome operation has been thereby rendered one of the easiest, special crown and bridge repair outfits and various patented and detachable facings being quite unnecessary.

Fig. 1 shows a small bridge with the facing broken away. After clearing away any fragments of porcelain remaining around the pins, the latter are covered with gutta percha or oxy-phosphate of zinc and trimmed so that an impression in foil can be easily withdrawn.

The procedure is the same as in producing a matrix for an inlay. Gold or platinum foil is swaged over the backing, the lateral surfaces of the adjoining teeth, and the adjacent gum, with wool or amadou. This foil impression is then removed on the end of a pencil of wax.

Invested in alcohol and asbestos and the wax removed, the matrix appears as in Figure 2.

A new facing is built up with body in the furnace, and appears as Figure 3. With the various porcelains now at our disposal there should be no difficulty in matching any tooth. After this has been allowed to

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cool gradually to insure perfect annealing, the foil is stripped and the glaze removed from the back of the new facing, Figure 4, with hydro fluoric acid. Any overlap can be trimmed from the edges with a square-edged stone, and undercuts made with a very small diamond disk to insure a good hold for the cement around the pins. After roughening the surface of the metal backing with a fine graver, fixation is accomplished by

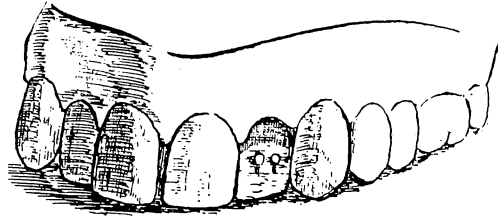


FIG. 1.

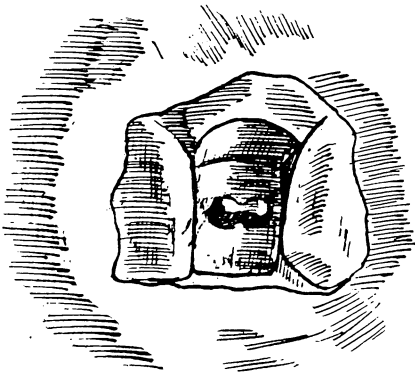


FIG. 2.

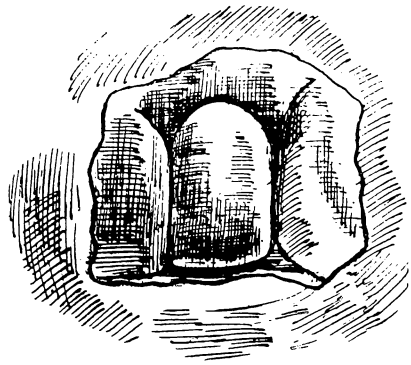


FIG. 3.

means of any cement suitable for inlay work. The whole is now varnished, and the facing held in place by wax cement flowed on to the sides of the adjoining teeth.

Means will readily occur to the operator whereby this method is applicable in cases where one or both pins are broken away from the backing.

Either high or low fusing body can be used, and if preferred the impression can be taken in dental lac and a matrix obtained by means of Ash's water-bag swager.

The result, Figure 5, is an extremely neat and strong repair—ten minutes will suffice to make the matrix, and five minutes to cement the facing, the rest of the work being done in the laboratory.

For this work I have always used the porcelains of Messrs. Klewe & Co. (Dr. Jenkins' formulæ).

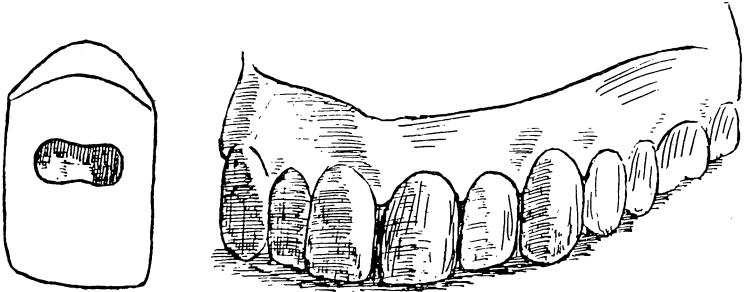


FIG. 4.

FIG. 5.

I am indebted to Mr. Howard Wordsworth for the illustrations herewith.

Method of Banding Roots for Porcelain Crowns with New Trimmers and Facers.

By J. C. HERTZ, Easton, Pa.

The object of my method is to construct a crown with sufficient strength of band and porcelain which will have no tendency to irritate the gingival margin and prevent the band and porcelain from causing *unusual fullness* at the *labial margin*; also eliminating the necessity of shading, or adding on to the facing at the labial margin (by allowing the facing to extend under it).

To secure these advantages the canal should not be enlarged toward the labial or buccal surface in order to allow for the necessary reduction of the root for the ferrule and facing which is seen in figures 1 and 3.

The line of finished root should not be entirely with the gum line, but even labially, and finished 1-16 of an inch above the palatal gum line (when the bite will allow it).

The trimmers and facers I have designed to facilitate this shaping are seven in number. (Fig. 6.) Nos. 1 to 3 are safe sided to cut the

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shoulder or depression at the labial portion only, with a groove to indicate the depth to penetrate. They are used as a *drill*, held so the *thumb* has support on the *adjacent teeth*, but, after the first full cut, take only one-half the width of that first cut, which will guide and make it quite easy, and as

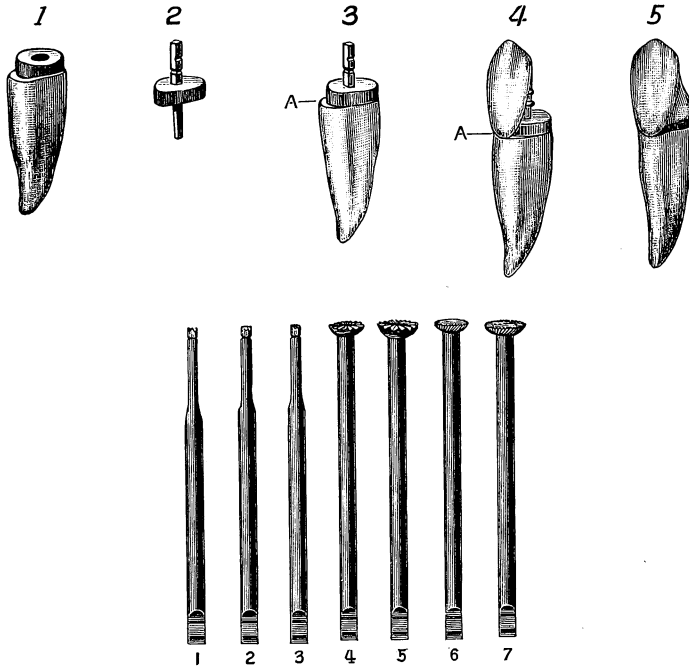


FIG. 6.

you approach the side take No. 6 or 7 trimmer, or small square end fissure burr to conform the angle. Nos. 4 and 5 are facers. Nos. 6 and 7 are safe sided trimmers used to even the depression and slightly trim on the sides and palatal portion. The band is conformed directly on the root, of No. 28 iridio-platinum, then soldered. Pure platinum of No. 33 or 34 gauge is used to complete the cap and allow ready adjustment of the pin, through small puncture in cap, which is secured with sticky wax, then removed and soldered with platinum solder, and replaced on the root. Any form of *facing or crown with or without pins can be used*, as I do not solder the pins of the tooth to the dowel. Figure 4 shows the adjusted facing, figure 5 the finished crown.

This is made practical by an investment used to secure the parts in their accurate position for the first biscuit, which is made by mixing two

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parts plaster and one part of fine fire clay to a thick batter. Place upon a depression made in this while soft a 1-8 inch thick paste of asbestos (water with fine asbestos) ; place the face of the crown on this, and cover the metal parts with the plaster and fire clay, also the cutting edge.

Make investment very small to readily dry out and enter a small oven ; subject to slow heat ; remove the wax and place the body on. Then biscuit, after which cool, remove from the investment and finish as if soldered.

The *asbestos paste* is used to *prevent* the *etching* of the facing by contact with the plaster and fire clay. The heat should not be carried higher than to a good biscuit or the asbestos may affect the facing.

The different forms of facings and crowns with the various ways they are *grooved between* the *pins* to allow setting the facing sufficiently *low* on the *post* without regard to the *pins*, will occur to the practical hand, for the band being 28 *gauge* can be made narrow to adjust to a short root owing to its *strength*.

Making Gold and Porcelain Inlays by the Impression and Fusible Metal Matrix System.

Clinic by Dr. R. M. CHASE, Bethel, Vt.

Since January, 1900, I have given various papers and clinics upon making inlays with gold and porcelain by first securing an impression of the tooth cavity and duplicating the same in a fusible metal matrix or mold. From this mold a foil matrix is wholly or partially made for porcelain, or where a gold inlay is indicated, foil or any other style of gold is directly packed into the fusible metal mold. This system has so many advantages which enable the dentist after becoming familiar with its simplicity, to adopt it in preference many times when the older method of forming the foil directly into the tooth cavity is unsatisfactory. However to those who still prefer the latter method I have devised a set of Matrix Formers, Figs. 1, 2, to shape the foil directly into the tooth cavity. Also a camphor compound known as petro-camphor to enable one to remove the foil without destroying the shape.

Petro-camphor does away with the crumbling so annoying when simplex camphor is used and should be used as follows: After forming the inlay foil into the cavity, take a piece of the petro-camphor a little larger than the cavity and force it into place with an instrument or burnisher

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slightly warmed, after which place a drop of cold water against the compound which will chill it, and enable you to withdraw the matrix without change of shape. Before burning out the compound place a small gold foil cylinder endwise upon the compound when any excess

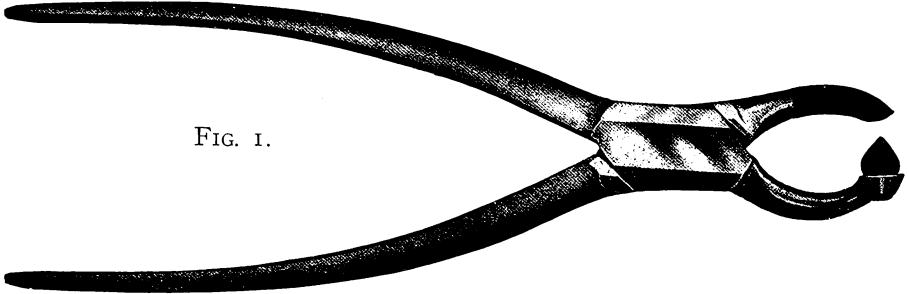


FIG. 1.

will be drawn up into the soft foil, leaving the foil matrix clean and bright.

In making porcelain inlays by the impression and matrix system while simple and easy, one should first familiarize himself with the little details to secure perfect and artistic results. A great deal depends upon

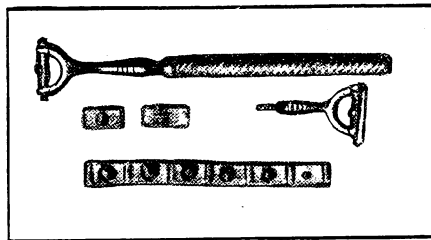


FIG. 2.

the proper shaping of the tooth cavity, which should be done thoroughly and with a view to artistic effects and adaptability to the mass of porcelain when finished. Make this one rule: to cut away sufficient tooth substance for easy access to the cavity, making the walls as near as possible at a right angle to the floor of the cavity and still have the orifice a trifle larger. To use a homely illustration, shape the cavity (so that when the inlay is completed it will fill the cavity) like a cork to a bottle. With a cavity so shaped there need be no fear of the permanency of porcelain inlays.

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Taking the Impression.

Starting with a properly shaped cavity proceed to secure a reproduction of the same. Divide the cavities into two general classes. The first, that of the labial, buccal and crown varieties, are to be taken with what is known as the Chase impression compound. This compound copies and reproduces perfectly the most delicate lines and shape of the cavity and should be used as follows: Take a piece of compound half the size of an English walnut, working and kneading it with the fingers, tempering it so that it will be a little stiff. If too soft either roll in a napkin to absorb the excess of the glycerine or work into the compound a little powdered pumice; if too hard work into the substance a drop or two of glycerine. One or two trials will enable one to make it just right. Place the compound in a shallow crown impression cup or tray and work the center of the mass up to a little point or conical surface about the size of the cavity. Dip the fingers into talcum powder and rub the surface until it presents a shiny appearance. With the cavity, tooth and gum dry, press the convex point into the cavity with a firm hand. This will give a perfect impression of the cavity as well as the surrounding parts, the latter giving ample surface to enable the adjustment of a strip of band material without disturbing the cavity impression. The band should be as large as the surface of the impression will allow. Carefully adjust the metal band or ring into the compound around the cavity impression; see that the edge of the band sinks into the compound to prevent the molten metal from escaping underneath.

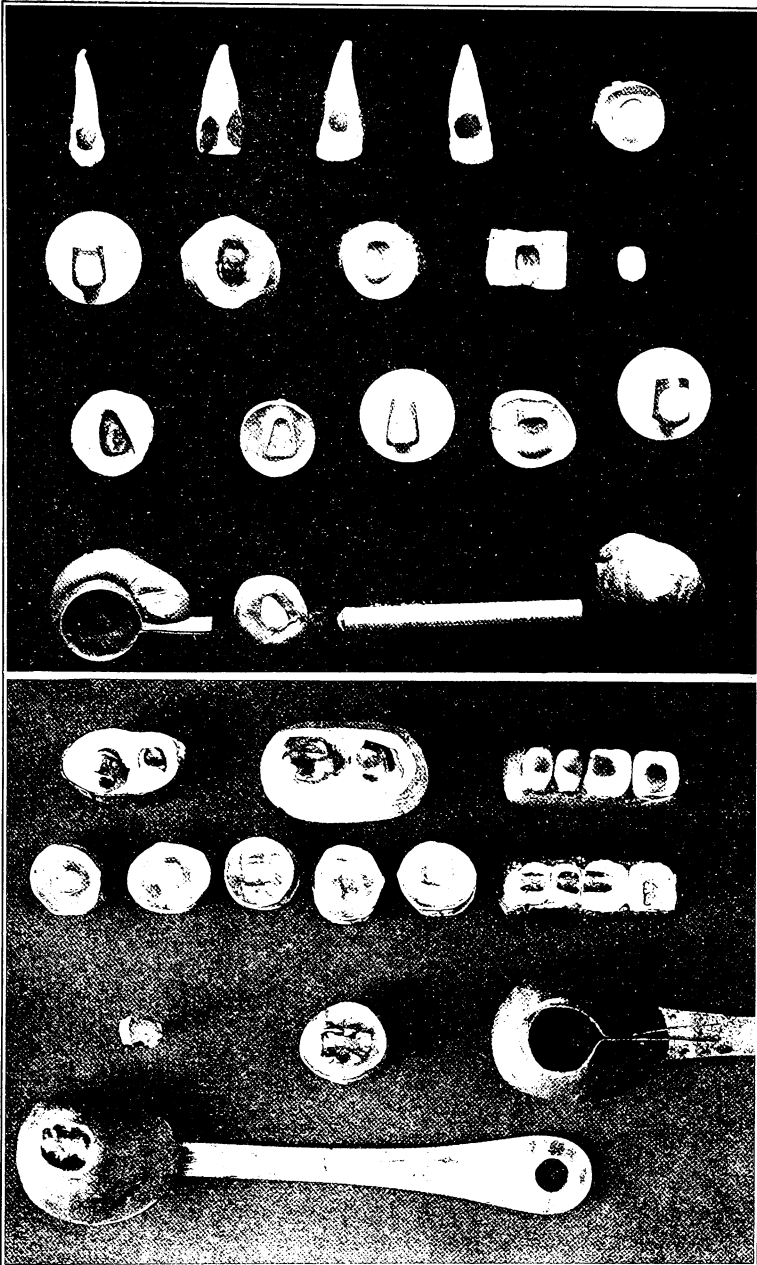
Making the Model of Cavity.

Heat two bars of Chase's fusible metal in a spoon or ladle to a degree that will just char or brown white paper. When this is done pour into the band on to the impression. As soon as the metal is cool, separate, and a perfect fac-simile of the cavity will result. Paint the floor of the matrix and about two-thirds of the depth of the cavity with shellac varnish, leaving about one-third of the depth of the cavity from the edge without any varnish. When dry proceed to burnish the gold or platinum foil into the mold preferably by the aid of the Chase Matrix Former. This will obtain a perfect foil matrix which will give the finished inlay sufficient space between it and the floor of the cavity for the cement to hold the inlay. In making a gold foil matrix in the metal mold a little vaseline should be brushed over the metal mold to prevent the foil from adhering to the baser metal.

Impressions of Approximal Cavities.

The second class consists of all the cavities in the approximal surfaces and should be taken with Chase's special cement which is prepared expressly for approximal cavities. The first step, and the all important one, the lack of which has caused many failures, is

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space between the teeth; unless you have this, failures will surely result. The best method ordinarily is to cut a strip of rubber dam about one-eighth inch wide and place between the teeth.

The next day increase to two and so on until ample space is obtained. When the space is a little wider than the depth of the cavity hold the space a day or two by a small wooden wedge. At the end of this time there will be but very little tenderness of the teeth and you are ready to complete the shaping of the cavity and to get a perfect impression which usually takes about twenty minutes for the impression cement to harden and can then be tilted out of the cavity without fracture.

First wipe the cavity with vaseline to facilitate the removal of the impression cement. After mixing the impression cement powder with water to a creamy consistency fill the cavity, allowing the cement to overlap the edges. Sometimes owing to atmospheric conditions the impression cement does not set as quickly as desired; a little salt may be added to the water, about one-quarter teaspoonful to an ounce which will hasten the hardening. When the cement is hard it can be easily removed and should then be heated to expel all moisture and placed with the convex surface uppermost upon a smooth piece of Chase's impression compound. Surround the cement filling with a metal band and pour into enclosure Chase's fusible metal heated as before described. This impression cement enables the operator to get an impression of difficult cavities which would be impossible with the impression compound.

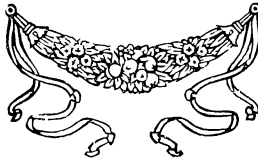
Often it is advisable after the foil matrix is swaged into the cavity mold to fill the matrix with petro-camphor, pressing it thoroughly into all parts of the foil matrix. Try this into the tooth cavity and give the final burnishing around the edge which will give absolute fit, and with the space provided by the thickness of the shellac in the fusible metal matrix and the corresponding space between inlay and floor of cavity you may be assured if you put pressure enough upon the inlay while adjusting to expel the excess of the cement and keep the pressure up by a soft wood wedge between the inlay and the opposite tooth until the cement crystallizes, the result of this system will be very satisfactory.

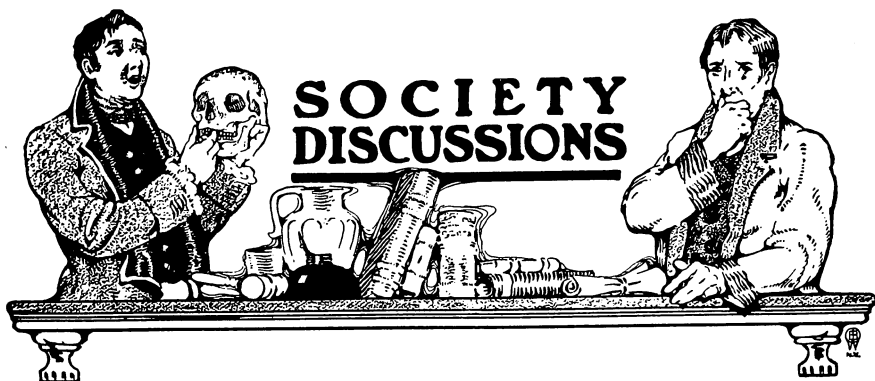
The preparation for gold inlay work requires the same thoroughness and the fusible metal matrix should be obtained the same way as for porcelain inlays. After securing a perfect metal or matrix mold the foil matrix can be shaped into this and may be filled with solder. I however prefer to make a gold filling directly into the fusible matrix. This may be easily and quickly done by imbedding the metal matrix in a little plaster of Paris either on the bench or something that will make a firm foundation, or fasten to the bench vise, then proceed to fill with gold, or dismiss your

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patient and make the filling at your leisure. Cylinders, ropes, or fiber gold can be used for making inlays, holding it with an instrument until you get it well anchored, or if the shape of the cavity is favorable retaining pits can be made at the bottom of the cavity. Burnish thoroughly and partly finish the filling in the matrix. To remove the filling, hold the matrix over a spirit lamp and as soon as the alloy melts a little from the edge of the inlay, give the matrix a quick jerk and the filling will come out clean and a perfect inlay to the tooth cavity.

In building up a bicuspid or molar tooth after the cavity is prepared, mold a little wax into the cavity, and ask your patient to close the mouth. This will give the articulation of the opposite tooth; this placed into the matrix and arranged on an articulator will enable you to complete the occluding surface without any subsequent grinding when placed in the tooth-cavity. Make slight undercuts with a wheel burr at the sides of cavity, also some little depressions in the base of the inlay. If retaining points were made in the matrix, these gold points should be trimmed off. Use any good cement mixed to a creamy consistency. Before the final adjustment of the inlay, try it in the cavity and see if it fits perfectly at the edges, if it does not, a perfect fit can be secured by holding the filling with an instrument and burnishing it to the edge of the cavity. Fill the cavity with the cement and force the inlay into place holding it firmly a few minutes and then coat the edges with sandarach varnish. After a short time it can be finished up or left for a subsequent sitting.





Central Dental Association of Northern New Jersey.

A regular monthly meeting of the Central Dental Association of Northern New Jersey was held at the Cafe De Jeanne, Newark, N. J., on Monday, October 15, 1906. In the absence of the President, Vice-President Marshall called the meeting to order.

The secretary read the minutes of the last meeting which were approved as read.

The Vice-President then introduced Dr. Harold S. Vaughan, Assistant Surgeon Metropolitan Throat Hospital, New York City, who presented a paper entitled "The Anesthetization of the Dental Pulp by Nerve Blocking and Pericemental Injection."

Discussion of Dr. Vaughan's Paper.

You have heard the evidence the essayist has presented to you regarding this method of anesthetizing teeth, and although it does not appear conclusively that it will suffice to overcome the pain accompanying such operations, yet it may, in many ways, lead us to investigations by which we may obtain results that will be more satisfactory than the methods we have heretofore used such as cataphoresis and many other things that have cost us much money and a great deal of time, and have been almost universally discarded.

Dr. Kjennerud, of Norway, when he called on me said that he had universal success, and did not know what it was to fail in anesthetizing teeth by his method. He claimed that the local anesthetic which he used was discovered by himself; but he would not divulge the formula

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nor give me any of the anesthetic. He wanted to sell the right to use it in this country. I told him that would not be practical here although he might do so abroad, so he left with his preparation. I induced him to give some demonstrations, and, as Dr. Vaughan has stated, he made one demonstration in my office, and one in Dr. Vaughan's, both of which were absolutely successful, while two that he made in Dr. Starr's office were not quite so successful; but he claimed that was due to the fact that he would not divulge a certain secret method in the technique because it was largely through such method that he obtained success. From that I drew the conclusion that the manner in which he introduced the anesthetic was as important as the solution which he used. In Dr. Starr's office he tried to anesthetize a lower second bicuspid. The patient was very nervous and timid and a very unsatisfactory patient, and, as you all know, the bone surrounding the alveolus in the lower jaw is thicker and denser than in the upper jaw. Dr. Kjennerud did not appear to be able to force the needle deep enough to reach the periosteum—far enough down on the root to drive the local anesthetic to the nerve supply entering the apex. By careful conversation with him I was able to learn that in these cases he would at home use a very fine spear-shaped instrument, first anesthetizing the mucous membrane slightly in order to pierce a place for his needle to enter through the firm hard external plate of the alveolar process, or he would use a very fine bur and go through this plate, and then inject the anesthetic. The operations, as he made them in my office and as I saw them, on the lower teeth, seemed to require a great deal of pressure and, due to this pressure upon the jaw, there was considerable danger of breaking the needle; in fact he broke two needles, and he told me that it was very difficult for him to obtain needles that were strong enough. In the cases that Dr. Vaughan spoke of where the upper teeth were obtunded the result was almost instantaneous, and in emergency cases where pulp is to be extirpated I am sure the method would be a most valuable one. But it must be carefully examined into so as to obtain a knowledge of the best way of making the application quickly and without too much pressure.

Dr. Vaughan states that he tried his method on various teeth, but did not give us his percentage of success, and I should like to know which teeth are most difficult to anesthetize, and I should also like him to state how he reaches the mental foramen. Of course we can learn that by studying the anatomy, but Dr. Vaughan has already looked the matter up.

Dr. Kjennerud told me that by injecting anterior to the second superior bicuspid all the teeth anterior to this tooth to be treated would be

SOCIETY DISCUSSIONS

anesthetized so that pulps might be removed or cavities excavated without pain in all that region.

We see many advertisements of nostrums for which the manufacturers claim wonderful efficiency. I think Dr. Vaughan has settled that point in this matter. He has tried the various solutions and found them far less efficient in anesthetic qualities than a cocaine solution freshly and carefully prepared.

That is all I can say on this subject, but I trust that some of you may be able to tell us how we may obtain the best made and strongest hypodermic needles. The great difficulty with them is that in passing them through the bone they are apt to break and the little hole in the point is apt to clog when it passes through the alveolar plate. I think that could be obviated by having the syringe opening very small, and instead of having the needles set as they are now in the holder, that is screwed on to the syringe, we might get a syringe that tapers and ends in a very sharp point so as to prevent the needle from breaking at the point of insertion into the holder. Perhaps some of you may know of such, but I have not been able to find them.

I have no doubt that the process as described by
Dr. Luckey. Dr. Vaughan, carefully carried out, would result in success. But I do not see the necessity for it; I do not

see any reason why we should anesthetize so large an area to produce so small a result—to get at the pulp of a single tooth. We are not in the habit of extracting the pulps of numerous teeth adjacent to one another at one time. For the purpose of tooth extraction I should think the method might be admirable. It has been practised for a long time with perhaps a difference in the solutions that have been used, cocaine being, of course, the active principle in all of them. But for the anesthetization of a pulp and its painless removal it is not necessary to touch any other tooth but the one operated on, and it can be done with absolute certainty and perfect success in almost every case, by pressure anesthesia. The only cases that I know of which prevent immediate success are those where the pulp contains nodules, pulp stones, which will frequently interrupt the process of anesthetization; whether the tooth has been decayed or whether it is absolutely perfect practically makes no difference. It is of course easier, where there is a large cavity and the pulp is almost exposed, to carry out the process of anesthetization, but the drugs involved in the methods are practically the same as those used in the processes described by Dr. Vaughan, the sole difference being that one is applied with, and the other without, the hypodermic needle.

It has been my pleasure as well, I may say, as the pleasure of many

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of my patients, for me to remove many large and actively vital pulps with practically no pain whatever by the use of adrenalin and cocaine.

A little while ago Dr. Shields described before this society his method, which is practically the method followed by most of the gentlemen in this room, and it does seem to me that it makes absolutely unnecessary a process of this kind, of plunging needles into the gum tissue or the pericemental tissues at all. Not that I wish to discourage the essayist. What we are after are the best methods to obtain certain results; those we need and those we must have for our own benefit and the benefit of our patients. But this obtaining of the result by a roundabout method in these later days is unwarranted, it is unnecessary—perhaps that is a better word to use.

From the discussion I judge the paper is misunderstood; the gentleman discussing the paper seems to think that the anesthetization is solely for the extirpation of pulps, while as I understand the paper it is proposed to anesthetize the pulp not only for extirpation but for painless excavation. We are all looking for that, and if anything can be done which will lead to more perfect methods in that respect it will be of very great benefit to the profession.

There must have been a slight misunderstanding, I think, although the discussion, as far as I understand Dr. Luckey, is a very satisfactory one because it brings out many points that were not brought out before.

I feel that much temporary work is being done on teeth in the filling of cavities because they are sensitive, and the patient can not endure proper excavation for the placing of a solid permanent filling. Dr. Adelberg hit the nail on the head. When a cavity presents to be filled where the decay necessitates considerable cutting, especially where the enamel margins are involved to such an extent that there must be considerable extension, it is very difficult to obtund such dentine which is inflamed, hyper-sensitive. I am sure there is not a man in this room who will disagree with me on this point. It is in these cavities where the pressure anesthesia will not suffice that injections are so useful. The two cases I saw in Dr. Starr's office were of the most difficult that you have to deal with, where metal fillings could not be placed, where the anesthesia was not complete; although the cavities were entirely excavated, they could not be touched at first.

In inserting this needle, which I understand is a longer one than we usually use at such a distance, is there not more or less soreness for several days

afterwards, more than there would be from using a small needle; are there not some bad results ensuing from injection in the apex of the root?

Dr. Fossume spoke of the danger of breaking the
Dr. Vaughan. needle. I have found it necessary to exert a great deal of pressure and to have the beveled point of the needle directed against the root. If the needle breaks it is always at the point of insertion into the shank and is easily withdrawn.

As to Dr. Richard's question I did at first use long needles, but I was unable to insert a long needle far enough—that is any further than a short one; I could only insert it possibly for one-quarter or three-eighths of an inch so that short needles are just as good as long ones. You can not pass the needle up to the apex by any means; so I have used the ordinary ones.

Dr. Fossume asked as to the percentage of failures. Out of thirty cases I have had two failures. I might have succeeded perhaps in those two cases had I persisted, but I used the usual quantity that I had been using and got no result. One of them was a right upper first molar; I considered that a failure although I did anesthetize it enough to insert a needle into the exposed pulp and inject, and in that way finish it, but it was not a success. My other failure was a central incisor; in that case I must have used 15 or 20 minims, but was not able to force it to the apex.

Dr. Luckey has spoken of his wonderful success with pressure anesthesia; although I have had a good deal of success with that method, still I think I have had more failures, and I have tried to carry it out as carefully as I knew how.

It so happened that the molar and central incisor that I have spoken of were hard to anesthetize; still I do not think that would usually be the case, for I consider the multi-rooted teeth as the hardest. In the case of an upper molar you must inject into both the buccal and the palatal surfaces, and that makes it a little more difficult. I have found third molars comparatively easy to anesthetize.

As to injecting at the bicuspid and anesthetizing all of the teeth anterior thereto, that has been contrary to my experience; I have found that it has only anesthetized the pulp of the tooth which I injected, and not the adjacent teeth, and the anesthetization of the surrounding gum would depend largely on whether the needle was well inserted into the pericementum or whether a part of the solution was injected into the gum. Of course in the latter case it would spread and anesthetize the gum over a greater or lesser area, but in general the anesthesia was chiefly confined to the teeth injected.

As to the length of time the solution will keep I have not found it necessary to prepare a fresh solution for every operation; I have kept

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solutions as long as three or four weeks and apparently the last part was as good as the first.

I think Dr. Fossum's suggestion of a tapering point a very good one. In some cases, while the needle would not break it would give way at the point where inserted into the shank, and that is largely because the majority of them are merely stuck into the ends without going in to any great depth.

The method has been spoken of as a roundabout way, but I do not think it is. In the pericemental injection you simply catch the nerve as it enters the foramen instead of taking it at the other end, and my experience is that you can do so easily and in less time than you can make the pressure anesthesia.

As to the after effects of two or three days' suffering I have not found such to be the case. Of course if you insert a needle in the gum there will be a local point of soreness, but I have had no soreness other than practically that of a pin prick or a little sensitiveness as of the tooth on biting; but you find that after the pulp is removed it is due to the strangulation of the vessels at the end of the root and the local irritation resulting. There has been no sloughing at all. Often emergency cases come in where patients are suffering a great deal and it is necessary to devitalize the pulp. I have then found this a very excellent method to use and far better than the sealing in of arsenic because the pain is relieved immediately and the cause removed.

To reach the mental foramen, insert the needle at the gingival buccal angle just anterior to the root of the lower second bicuspid; the point is then directed downward to reach the bone just in front of the apex of this root, where it will enter the foramen.

As to its value in hyper-sensitive cavities I have found it very valuable in such instances. Of course it is not worth while to use this method for ordinary simple cavities, but it will really help you out very much in severe cases.

On motion, a vote of thanks was extended to Dr. Vaughan for his very excellent paper.

On motion adjourned.



In the department of Orthodontia, in this issue, will be found a paper, and a discussion thereof, which should interest every dental practitioner, whether engaged in the correction of irregularities or not. This for two reasons.

**Orthodontia
a Prophylactic
Measure.**

In the first place it is here pointed out that the work of the orthodontist must, from this time on, assume a new meaning. Heretofore, except within very recent years, the regulation of teeth has been mainly a cosmetic venture; hereafter it must be counted as a prophylactic procedure. Upon the restoration and maintenance of misplaced teeth into true occlusal relations depends the ability of the individual to properly perform the function of mastication, and there can be little doubt that the sequellæ of improper mastication include nearly all the ills to which man is subject. Real vital energy is secured only through proper nourishment, and lacking this there must follow a lessened vital resistance to disease germs and other causes of ill health. Moreover, the malrelation of teeth is a preventive of perfect oral

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cleanliness, and with improper hygiene of the mouth the teeth must become more subject to caries.

The Question of Commissions. The second point in the paper, which is of common interest to both specialist and general practitioner, is the suggestion in regard to the giving and receiving of commissions, in return for the recommendation of patients. The whole subject was most thoroughly discussed; much more so than will appear in the printed report of the meeting. Many orthodontists present related experiences so mortifying that a unanimous antipathy to the whole commission proposition was engendered, resulting in the prompt adoption of the proposed resolution forbidding members to engage in the practice of sharing fees unknown to the patient. But these experiences were many of them given in such detail that they assumed a personal aspect which made it seem wiser to eliminate that part of the discussion prior to publication, rather than cause unpleasant comment upon practitioners who might easily be recognized because of the localities of the specialists narrating the stories. This is mentioned here, however, to silence the comment that such a resolution was needless, and that men might be trusted to arrange their own business relations. The truth is that men can not be trusted in this regard; that is, some men can not be trusted.

Dr. Charles Ash, the President of the Second District Dental Society, was present and indorsed the movement. Later he had a similar resolution introduced in the Second District Society, and after due course this was unanimously adopted as an appendix to the code of ethics. Thus a specialist society has forbidden the giving of commissions, and a purely dental organization has forbidden the acceptance of commissions.

One clause of the resolution declares that there shall be no division of fees, but that where a specialist and a general practitioner share the work, each must render his own separate bill. This was added to prevent evasion of the spirit of the resolution, the commission being paid in the form of a "share" of the fee, said share to be accounted for by erecting some imaginary responsibility.

But it never was intended by the framers of the resolution that there should be any interference with the legitimate management of the business of a dentist or of an orthodontist. Thus a general practitioner, who

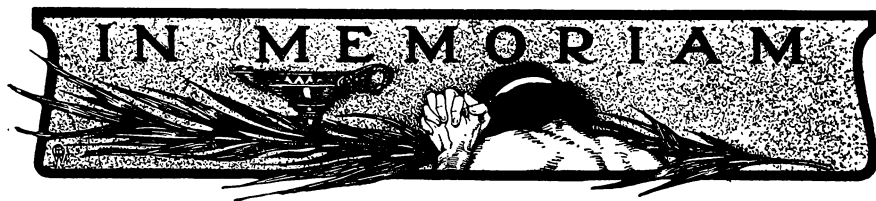


chooses to retain control of his own patients, and to assume responsibility for and real supervision over the work, is surely entitled to engage the services of an orthodontist, just as he would an anesthetist, or a surgeon, rendering his own bill to his own patient, and settling with the orthodontist, anesthetist, tooth extractor, rhinologist, surgeon, or any other specialist, the whole point at issue being that the patient must thoroughly understand the relation of himself to each of the attendants.

But where, for example, a dentist in a suburb feels unwilling to assume full care and responsibility in the management of an orthodontia case, and arranges for the aid of an orthodontist who shall supervise the work and care for the patient at definite intervals, while the practitioner likewise cares for the patient between the visits to the orthodontist, there certainly should be separate bills, just as there is a division of responsibility. A similar condition in medical practice would be where the general practitioner advises a patient to secure surgical aid at a hospital, himself taking part in the after treatment. Here it is both customary and proper for the surgeon and the family doctor to render independent bills.

In simpler language, if the patient knows that he is paying two persons, and why, there can be no ethical breach. It is the secret business arrangement which is abhorrent and intolerable.





Dr. C. R. Taylor.

Illinois State Board of Dental Examiners Memorial Resolutions.

Whereas, on roll-call at the opening session of the November, 1906, meeting of the Illinois State Board of Dental Examiners, the name of Charles R. Taylor receiving no answering response, makes us pause to pay tribute to his worth and memory. Little did we think at our last parting that at our next meeting our long-time friend and co-laborer, strong in all the elements that constitute a lovable man, would be beyond the reach of voice, and his chair stand vacant at our table—reminding us that the strongest ties of friendship must sooner or later be broken, but not forgotten. In token of our affection and appreciation of Doctor Taylor's influence in private and public life for the betterment of all who had the good fortune to know him, it is

Resolved, That a page of our Records be set apart, and the sentiments herein expressed be inscribed thereon.

Dr. Francis David Nellis.

Francis David Nellis, M.D.S., was born in the town of Seward, Schoharie County, N. Y., October 1, 1835, of Dutch ancestry. His father, Joseph Nellis, served in the war, and his mother, Dany Dewey, was a relative of Admiral Dewey.

He began the study of dentistry in the office of his brother, Jacob Nellis, M.D., D.D.S., in Schoharie County, and practiced in Schoharie, Delaware, and Otsego Counties before coming to Syracuse in 1866, where he was engaged in active work till October 6, 1906.

In early life he married Eva Eliza Gardiner, of Schoharie County, who died August 13, 1883. He was a member of the Masonic Fraternity, Syracuse Lodge, 501 F. A. M., the Masonic Veterans of Central New York, and the Citizens' Club. After an illness of six weeks, he died at his home, at midnight, November 19, of heart failure, leaving two children,



Franklin Dewey Nellis, of Auburn, and Mrs. Louie Fritcher of Syracuse, and three grandchildren, Eva Liza Nellis, Theodore and Joseph Nellis Fritcher.

Dr. Nellis was a contemporary of Westcott, Palmer, Smith, and Barnes, a pioneer in the history of the New York State Dental Society, the Fifth District and the Syracuse Dental Society, and a loved and honored worker in the front rank till the last. A banquet was given in his honor by the Syracuse Dental Society upon the completion of his fiftieth year of dental practice.

He was conservative, steadfast, consistent, and these qualities, combined with a devotion to the best interests of his chosen profession, made him a source of inspiration to his fellow practitioners, to whom he endeared himself by his genial and friendly nature.

Dr. U. D. Billmeyer.

Died, at Asheville, North Carolina, November 24, 1906, in his fifty-second year, Dr. U. D. Billmeyer, of Chattanooga, Tenn.

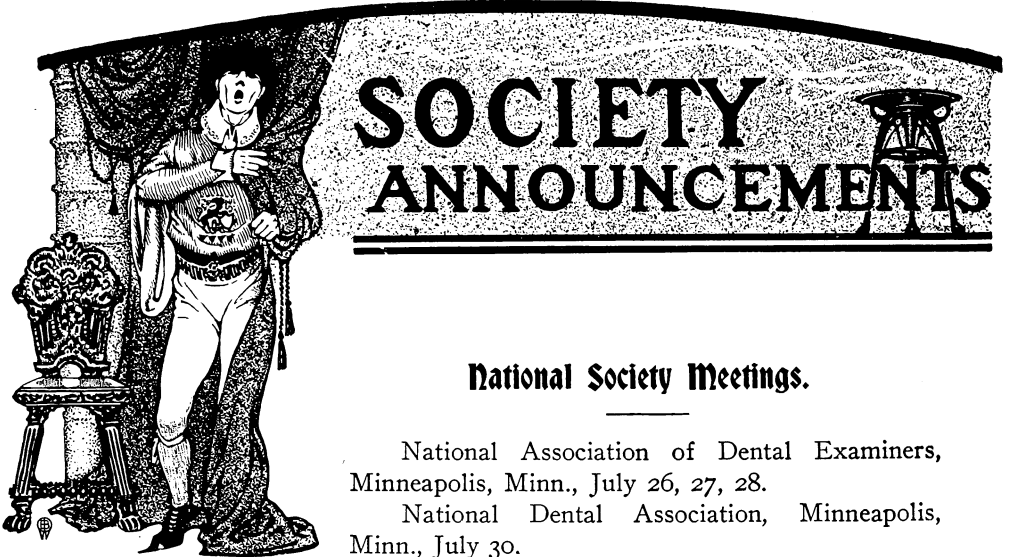
Dr. Billmeyer was born and spent his youth in Michigan, was graduated from the State Normal School at Ypsilanti in 1876, and from the College of Dental Surgery of the University of Michigan, in 1880. He was chosen assistant to the Professor of Operative Dentistry in his Alma Mater, serving with honor and distinction for two years, resigning to seek a warmer climate in search of health.

In 1883 Dr. Billmeyer settled permanently in Chattanooga, Tenn., and became prominently identified with the business and social interests of that city. His sterling qualities as a gentleman, scholar and operator soon attracted to him the best and most cultured portion of the community.

Dr. Billmeyer was one of the most skillful operators in the South, and took a leading position in the dental societies. He was elected President of the Tennessee State Dental Society in 1897, and in 1901 was tendered and accepted the chair of Professor of Operative Dentistry in Vanderbilt University, which position he was compelled to resign two years later because of poor health. Never robust, and fighting from youth that scourge of the human family, tuberculosis, he finally, in 1904, gave up practice and devoted his time to a vain search for health. Dr. Billmeyer loved his profession and worked always by precept and example to raise it to a higher plane. He was a Knights Templar and a Shriner.

The world has lost a valuable citizen, and the dental profession one of its most brilliant and honorable members.

R. M. P.



National Society Meetings.

National Association of Dental Examiners,
Minneapolis, Minn., July 26, 27, 28.

National Dental Association, Minneapolis,
Minn., July 30.

State Society Meetings.

Alabama Dental Association, Birmingham, May 14, 15, 16, 17.

Arkansas State Dental Association, Eureka Springs, May 29, 30, 31

Connecticut State Dental Association, New London, April 16, 17.

Florida State Dental Society, Atlantic Beach, June 6, 7, 8.

Georgia State Dental Society, Atlanta, May 7, 8, 9, 10.

Illinois State Dental Society, Quincy, May 14, 15, 16, 17.

Kentucky State Dental Association, Louisville, May 20, 21, 22.

Maine Dental Society, July 16.

Minnesota State Dental Association, Minneapolis, July 30, Aug. 3.

Montana State Dental Society, Helena, April 12, 13.

Nebraska State Dental Society, Lincoln, May 21, 22, 23.

New Jersey State Dental Society, Asbury Park, July 17, 18, 19.

New York State Dental Society, Albany, May 10, 11.

Oregon State Dental Association, Portland, May 9, 10, 11.

South Carolina State Dental Association, Anderson.

Vermont State Dental Society, Burlington, May 15.

Virginia State Dental Association, Jamestown, Sept. 10, 11, 12.

Wisconsin State Dental Society, La Crosse, July 16, 17, 18.



Minnesota State Board of Dental Examiners.

The Minnesota State Board of Dental Examiners will hold its next regular meeting at Minneapolis, in the Medical Building of the State University, on April 2, 3, and 4, 1907.

All applications must be in the secretary's hands by 11 o'clock of April 2. Candidates will be furnished all necessary blanks and such other information as is necessary upon application to

GEO. S. TODD, D.M.D., Secretary,

Lake City, Minn.

California Board of Dental Examiners.

At the last examination held in December by the Board of Dental Examiners of California, there were forty-seven applicants of whom twenty-four were successful and were granted licenses. The next examination will be held in Los Angeles, beginning on the second Monday in June. This will be followed by an examination in San Francisco, beginning on the third Monday in June. Officers were elected for the ensuing year as follows: President, Dr. Garrett Newkirk, Pasadena; secretary, Dr. C. A. Herrick, Jackson; and treasurer, Dr. Joseph Loran Pease, Oakland.

C. A. HERRICK,

Secretary Board of Dental Examiners.

Odontotechnique Society of New Jersey.

The Odontotechnique Society of New Jersey will hold its next regular meeting on Saturday, March 2, 1907, at Achtel Stetter's, Newark; the paper of the evening will be read by Dr. Corwin of Newark, subject "Adenoids."

Plans are now on foot for a clinic to be held on the afternoon of the April meeting date, which has been changed to the date of Wednesday, April 3, to be followed by a banquet in the evening at which a paper will be read by Dr. Ellison Hillyer of Brooklyn, subject "The Progress—Past and Present—of Prosthetic Dentistry." This will be an important event, and one of profit to the profession. A large attendance is expected.



National Association of Dental Examiners.

The National Association of Dental Examiners will hold their Twenty-fifth Annual Meeting in Minneapolis, Minn., beginning Friday, July 26, and continue through the 27th and 29th.

Accommodations have been secured at the leading hotel of Minneapolis, "The West Hotel." Rates as follows: Room without bath \$1.00 per day for each person occupying the room. Room with bath, \$2.00 per day for one person and \$1.50 per day for each additional person in room. Hotel on European plan. Any room in the hotel capable of accommodating two people. Telephone in each room; hot and cold water. A large attendance of delegates is earnestly requested. Committee on Colleges, Joint Conference Committee, Tabulation of Examining Boards reports, the Committee for promoting a system of credits and uniformity of Examinations will all give exceedingly interesting reports, valuable to all the members of the Association. Railroad rates will be announced later.

For information apply to Charles A. Meeker, D.D.S., secretary and treasurer, 29 Fulton Street, Newark, N. J.

New Jersey State Board of Registration and Examination in Dentistry.

The New Jersey State Board of Registration and Examination will holds its Semi-annual Meeting beginning Monday, July 8, 9, 10, and 11, in the Assembly Chamber of the State House at Trenton, N. J.

For information kindly apply to the secretary.

A photograph of the applicant must be filed with the application.

Practical and theoretical work completed at the session.

CHARLES A. MEEKER, D.D.S.,

Secretary of Dental Commission.

29 Fulton Street, Newark, N. J.

Montana State Dental Society.

The Montana State Dental Society will hold its next meeting in Helena, April 12 and 13, 1907.

Helena, Montana.

W. E. TRERISE, Secretary.



Resolutions Adopted by the American Society of Orthodontists, New York, December 29, 1907.

Resolved, That in the opinion of the members of the American Society of Orthodontists, the practice of paying a commission, honorarium, or any sort of fee, in consideration for the reference of a patient is both unwarrantable and unprofessional; and be it

Resolved, That the payment of any such commission, honorarium, or fee, by any member of this Society, shall be sufficient cause for the expulsion of said member, by vote of the Society after conviction; and further be it

Resolved, That in case of co-operation in the care of a patient between a general practitioner and an orthodontist, there shall be no division of fees, but each man shall render a separate bill for his personal services.

FREDERICK S. MCKAY, Secretary.

First French Congress of Stomatology.

A congress on stomatology styled the "First French Congress of Stomatology" will take place in Paris from the first to the fifth of August, 1907. The committee of organization is as follows: Honorary presidents, Drs. Galippe and Redier, at Lille; president, Dr. Cruet; vice-presidents, Drs. Claude Martin, of Lyons, and J. Ferrier; general secretary, Dr. Chompret; treasurer, Dr. Gires. The congress will be opened to all French and foreign doctors of medicine who are interested in dental and oral science. Subscriptions and communications should be addressed to the general secretary, Dr. J. Chompret, 182 rue de Rivoli, Paris, France.

Connecticut State Dental Association.

The forty-third annual convention of the Connecticut State Dental Association will be held at New London, April 16 and 17, 1907. An excellent meeting is assured.

E. S. ROSENBLUTH, Secretary.

1051 Main St., Bridgeport, Conn.



New Jersey State Dental Society.

The New Jersey State Dental Society will convene in the Auditorium, Asbury Park, N. J., beginning Wednesday, July 17, and continue 18 and 19.

The exhibitors will please communicate with Dr. Walter Woolsey, Elizabeth, N. J. Clinicians communicate with Dr. Charles H. Dilts, Trenton, N. J. Essayists communicate with Dr. W. A. Jaquette, Salem, N. J.

CHARLES A. MEEKER, Secretary,
29 Fulton Street, Newark, N. J.

St. Louis Society of Dental Science.

Consolidation of the Fraternal Dental Society and the Society of Dental Science of St. Louis.

At a joint meeting of the Fraternal Dental Society and the Society of Dental Science of St. Louis, held December 18, 1906, a consolidation of the two societies was effected, the society to be known in the future as the St. Louis Society of Dental Science.

The officers and committees for the ensuing year are: D. O. M. Le Cron, president; Richard Summa, vice-president; Clarence O. Simpson, secretary; W. E. Brown, treasurer. Executive committee, W. L. Whipple, E. E. Haverstick, Herman F. Cassel. Advisory council, George A. Bowman, A. H. Fuller, Adam Flickinger, Wm. Conrad, Burton Lee Thorpe, Edward H. Angle, E. P. Damron.

CLARENCE O. SIMPSON, Secretary.

457 Century Bldg., St. Louis.

American Dental Society of Europe.

The American Dental Society of Europe will hold its next annual meeting in Rome, Italy, at Easter, 1907. The exact date is March 29-30, and April 1. A very cordial invitation is extended to members of the profession to be present. As it is the first meeting of the Society in the "Eternal City," it is hoped it may be the most enjoyable one in its history.

J. W. GALE, Hon. Sec'y,
79 Hohenzollern-Ring, Cologne (Rhine), Germany.